DEVELOPING A CUSTOMER SATISFACTION INDEX FOR THE SAUDI ARABIAN CONSTRUCTION INDUSTRY

BY

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بِسْمِ ٱللَّهِ ٱلرَّحْمَٰنِ ٱلرَّحِيمِ

﴿ يَرْفَعِ اللَّهُ الَّذِينَ آمَنُوا مِنْكُمْ وَالَّذِينَ أُوتُوا الْعِلْمَ دَرَجَاتٍ وَاللَّهُ بِمَا تَعْمَلُونَ خَبِيرٌ﴾

صدق الله العظيم

This Thesis is dedicated to

My Son (Jamal)

Khalid Jamal El Sakka

ACKNOWLEDGEMENT

All praises are for ALLAH (SWT) who gave me the strength to overcome all the challenges to complete my Master's Degree. May peace and blessings of Allah be upon prophet Muhammad (PBUH) and his companions.

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Finally, a special word of appreciation and love goes to my family, my wife, and my son for their unconditional love and support.

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THESIS ABSTRACT

FULL NAME OF STUDENT:		KHALID JAMAL EL SAKKA
TITLE OF THE STUDY	:	DEVELOPING A CUSTOMER SATISFACTION INDEX FOR SAUDI ARABIA'S CONSTRUCTION INDUSTRY
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In a competitive and dynamic business environment, like construction, a great attention should be paid to the customer (client) satisfaction. The use of a customer satisfaction approach for measuring performance has been widely emphasized.

There is no study conducted on customer satisfaction in Saudi Arabia's construction industry. This research measured and analyzed the satisfaction of the public clients in Saudi Arabia's construction industry.

The overall customer satisfaction index was found to be 66.23 % where the negative performance gaps revealed that, in general, the public clients are dissatisfied with the performance of construction contractors in Saudi Arabia. The study concluded that the factors that require immediate corrective action and improvement are: 1) Adherence to schedule (time performance), 2) Adequacy of contractors' resources (material, labor, and equipment), 3) Apply value engineering to reduce costs, 4) Provide notifications and explanations for work delays, and 5) plan and schedule jobs (i.e. tasks) promptly.

MASTER OF SCIENCE DEGREE

KING FAHD UNIVERSITY OF PETROLEUM & MINERALS

DHAHRAN, SAUDI ARABIA

خلاصة الرسالة

الإسم : **خالد جمال السقا**

عنوان الرسالة : **إنشاء مؤشر رضا العملاء لقطاع التشييد في المملكة العربية السعودية**

الدرجة الممنوحة : **ماجستر في العلوم**

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مما لا شك فيه أن قطاع التشييد له طبيعة خاصة من حيث التنافسية والديناميكية. ولذلك، يتوجب الاهتمام بمبدأ رضا العملاء (مالكين المشاريع) واستخدامه كنهج لقياس أداء المقاولين مع العلم بأن هذا النهج مطبق في العديد من الدول المتقدمة حول العالم.

تجدر الإشارة إلى أنه لا يوجد أي دراسة عن رضا العملاء في قطاع التشييد في المملكة العربية السعودية. ولذلك، تم خلال هذا البحث قياس وتحليل مستوى رضا المالكين للمشاريع الحكومية في قطاع التشييد.

أظهرت النتائج أن مؤشر رضا العملاء هو 66.23 % وبعد مقارنة توقعات المالكين مع مستوى أداء المقاولين الفعلي، اتضح أن المالكين غير راضيين عن مستوى أداء المقاولين في المملكة العربية السعودية.

وخلص البحث إلى استنتاج أن أبرز العوامل التي تتطلب تطوير و اتخاذ إجراءات تصحيحية فورية هي: 1) الالتزام بالجدول الزمني، 2) توفر الموارد الكافية (المواد، العمالة، المعدات)، 3) تطبيق هندسة القيمة لخفض التكاليف، 4) تقديم الإخطارات والتفسيرات في حال تأخر العمل، 5) التخطيط والجدولة السريعة للأعمال.

درجة الماجستر في العلوم

جامعة الملك فهد للبترول والمعادن

الظهران، المملكة العربية السعودية

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CHAPTER ONE

INTRODUCTION

This research will measure and analyze the satisfaction of the public clients in Saudi Arabia's construction industry whereby it is anticipated that the deliverables of this research will contribute to the success of construction projects. Basically, this research will fill a gap in the literature pertaining to customer satisfaction in the construction industry whereby it aims to identify the customer satisfaction factors (CSF) for Saudi Arabia's construction industry, to develop a customer satisfaction index for Saudi Arabia's construction industry, and to develop a customer satisfaction matrix for Saudi Arabia's construction industry.

1.1 Statement of the Problem

In a competitive and dynamic business environment, like construction, a great attention should be paid to the customer satisfaction. Constructing projects is viewed as a process that includes product and service components (Maloney, 2002) whereby the level of

fulfilling these components are vitally important for achieving customer satisfaction in the construction industry. Basically, customer satisfaction could be measured by determining the degree to which the product and service attributes of a constructed project meet and/or exceed the expectations of the customers (Karna, 2009). Several national customer satisfaction indices have been published across the world. These indices include the Swedish Customer Satisfaction Barometer (SCSB), the American Customer Satisfaction Index (ACSI), the European Customer Satisfaction Index (ECSI), the Norwegian Customer Satisfaction Barometer (NCSB), and the German Customer Satisfaction Barometer (GCSB). However, these barometers and indices cannot be adopted and applied in the construction industry because they were developed outside the construction industry. The construction industry is complex in its nature where it requires a unique set of criteria that could be used to accurately measure customer satisfaction and consequently the success of construction projects. Moreover, a number of authors including Ahmed and Kangari (1995), Soetanto *et al.* (2001), Karna (2004), Egemen and Mohamed (2006), and Othman (2015) identified a set of factors/criteria to investigate customer satisfaction in the USA, UK, Finnish, Jordanian, and Northern Cyprus construction industries. However, it is important to note that there is no study conducted on customer satisfaction in Saudi Arabia's construction industry. Therefore, the problem statement of this research is stated as ''the lack of a mechanism for measuring and prioritizing customer (client) satisfaction in Saudi Arabia's construction industry''.

1.2 Research Objectives and Motivation

Many researchers have recently emphasized the importance of customer satisfaction in the construction industry where it has become an important tool for assessing performance along with the principal criteria (i.e. cost, time, and quality) (Ahmed and Kangari, 1995). The satisfaction factors in construction industry differ amongst different authors and countries. It is worth mentioning that managing customer satisfaction is an essential element for any successful business, including construction industry, where satisfied customers play a central role in boosting the financial ratios of any organization. As a matter of fact, customer satisfaction will lead to high increases in profitability and will also affect future cash flows due to its significant strategic implications. Saudi construction industry is similar to other international construction practices in thriving towards enhancing customers' satisfaction. Indeed, leveraging customer satisfaction will help both owners and contractors in achieving project success. Basically, assessing customer satisfaction would enable the clients to appraise the products and services received from the contractors. Moreover, with the first-hand knowledge of what public clients (owners) value in Saudi Arabia, the contractors will be able to formulate strategies to improve customer satisfaction. As mentioned in section 1.2, the problem statement of this research is stated as ''the lack of a mechanism for measuring and prioritizing customer (client) satisfaction in Saudi Arabia's construction industry''. As a step towards filling the gap, this research aims to assess customer satisfaction in Saudi Arabia's construction industry.

In specific, the objectives of this research are:-

1- To identify the customer satisfaction factors (CSF) for Saudi Arabia's construction industry. This objective will be achieved by conducting an in-depth literature review to identify the CSFs in the construction industry. The applicability of the CSFs will be tested in real life practices from the perspective of participants who mainly worked for long time in Saudi Arabia.

2- To develop a Customer Satisfaction Index for Saudi Arabia's Construction Industry (CSI-SACI) to provide an overall measure of customer satisfaction. The CSI-SACI will detail the overall CSI-SACI score and the performance gap for each CSF. The performance gaps will be calculated as the difference between the expected and perceived levels of the contractors' performance against the CSFs.

3- To develop a Customer Satisfaction Matrix in order to prioritize the identified customer satisfaction factors based on their influence on customer satisfaction/dissatisfaction in Saudi Arabia's construction industry. This matrix will be developed by classifying and quantifying the CSFs using the Kano model classifications.

1.3 Thesis Organization

The remaining chapters of this thesis will be organized as follows:

- Chapter two will summarize the literature related to the concept of customer satisfaction and the main customer satisfaction factors in the construction industry. In addition, this chapter will include the identification of the main customer satisfaction factors for Saudi Arabia's construction industry.

- Chapter three will address the research methodology, survey questionnaire structuring, pilot study, target population, and the data gathering techniques used to develop the Customer Satisfaction Index and the Customer Satisfaction Matrix for Saudi Arabia's construction industry.

- Chapter four will present theory and calculations, results, and discussions pertaining to the Customer Satisfaction Index for Saudi Arabia's Construction Industry (CSI-SACI).

- Chapter five will present theory and calculation, results, and discussions pertaining to the Customer Satisfaction Matrix.

- Chapter six will present the thesis conclusion. This chapter will include summary, research contribution, and areas for future research.

The objectives of this research will be addressed in chapters 2, 3, 4, and 5 as detailed Table 1.1.

Table 1.1: Reseacrh Objectives and Relevant Chapters

Objective	Chapter
1	2
2	4
3	5
1,2, and 3	3 and 6

CHAPTER TWO

LITERATURE REVIEW

2.1 Background

Saudi Arabia's construction industry has witnessed an immense increase in activity whereby the country is now implementing a development program that will strengthen the economy and promote its growth. On-going and upcoming projects in Saudi Arabia's construction industry include new industrial complexes, communication infrastructures, railway lines, and many other strategic projects. Moreover, due to the unique and complex nature of construction projects, customer satisfaction has been identified as a central measure for the success of construction projects and as an important tool for achieving competitive advantage in the market (Othman, 2015). The concept of customer satisfaction was originally investigated by marketing theorists (Rusike, 2007). The emphasis of the marketing theorists was basically concerned with how satisfaction is achieved and the nature of its consequence on future purchase behavior (Rusike, 2007). Later, the Total Quality Management (TQM) movement gave rise to customer satisfaction measurement (Rusike, 2007). TQM is a management approach that emphasizes overall satisfaction through the continuous improvement to product and

service attributes (Yang and Peng, 2006). It basically focuses on translating satisfaction information to design and manufacture (Rusike, 2007).

As cited by Forsythe (2007), Richard N. Cardozo is considered one of the first marketing academics to investigate customer satisfaction in 1965 whereby satisfaction is usually explained as being a comparison of the customers' pre-purchase expectations and their post-purchase perceptions.

As cited by Rusike (2007), Richard Oliver's works in 1977, 1980, and 1981 initiated a focus on the antecedents of satisfaction namely the expectancy-disconfirmation sequence. The disconfirmation model is based on the comparison of customers' expectations and perceived performance. Basically, the disconfirmation model takes into consideration that customers have predetermined expectations toward certain attributes whereby these predetermined expectations are considered as benchmarks for comparison against perceived performance. The customers will be satisfied if the perceived performance is greater than the expectations (i.e. positively disconfirmed) and they will be dissatisfied if the performance levels fall below the expectations (i.e. negatively disconfirmed), (Karna, Junnonen, and Sorvala, 2009).

The Kano model was developed in 1984 where it is a theory of product development and customer satisfaction (Juan et al. 2014). Kano's model classifies the customer's preferences into five categories namely Attractive, One-Dimensional, Must-Be, Indifferent, and Reverse where these five categories can be described as follows:

- Must-be Attribute: Attributes that are expected by the customers and the customer would be dissatisfied if they were not fulfilled.

- One-dimensional Attribute: Attributes that are considered performance attributes where better performance leads to a linear increase in customer satisfaction.
- Attractive Attribute: Attributes that are not expected but can result in great customer satisfaction if available.
- Indifferent Attribute: Attributes that are not considered important for the customers and thus has no effect on customer satisfaction.
- Reverse Attribute: Attributes that are opposite to the one-dimensional attributes where a higher degree of achievement results in customer dissatisfaction. (Juan *et al.* 2014; Kano *et al.* 1984)

This classification provides an understanding of the product/service attributes which are perceived as being important to achieve customer satisfaction. It is also worth mentioning that the service quality model developed by Parasuraman *et al.* (1985) is considered a milestone for measuring customer satisfaction against service attributes. It is important to note that service quality model is based on the disconfirmation model where it basically provides a quantitative measure of the satisfaction gaps between customer's expectations and perceptions.

The Swedish Customer Satisfaction Barometer (SCSB) was established by Claes Fornell in 1989 (Turkyilmaz et al. 2013). The SCSB was the first barometer that provided a measure of customer satisfaction on the national level (Rusike, 2007). It therefore goes

without saying that the establishment of the SCSB has built the foundation for other countries to develop their national indices and barometers.

2.2 Definitions and Terminologies

2.2.1 Definition of Key Terms Related to Customer Satisfaction

In order to understand the concept of customer satisfaction, it is imperative to define the key terms that are related to it. Table 2.1 includes the key terms related to customer satisfaction and their definition by Foster (2013).

Table 2.1: Definition of Key Terms Related to Customer Satisfaction (Foster, 2013)

Key Terms	Definition	Author
Customer	*''A customer is the receiver of good or services''*	Thomas Foster
Internal Customer	*''Employees receiving goods or services from within the same firm''*	Thomas Foster
External Customer	*''The bill-paying receivers of our work. The external customers are the ultimate people we are trying to satisfy with our work''*	Thomas Foster
Customer Retention	*''Customer retention is measured as the percentage of customers who return for more service''*	Thomas Foster
Customer Loyalty	*''Customer loyalty can be instilled by offering specialized services not available from competitors''*	Thomas Foster
Customer Expectation	*''(1) What customers expect from a service provider; (2) a part of the SERVQUAL questionnaire''*	Thomas Foster
Customer Perception	*''(1) How customers view products or services; (2) the second part of the SERVQUAL survey''*	Thomas Foster

In the field of construction, Karna (2004) defined the customer as "*the owner of the project and the one that needs the constructed facility. In simple terms, the customer is*

the buyer of the product or service". In this research, the words customer, client, intermediate client, and owner will be used interchangeably where the customer is defined as the public client (owner) or intermediate client that receives the constructed project from the main contractor. On the other hand, the contractor is defined as the individual, firm, or corporation that constructs the project under the guidance of a client/consultant/designer. It is worth mentioning that all mega projects in Saudi Arabia are sponsored by public subsidized companies.

2.2.2 Definitions of Customer Satisfaction

There is a consensus among many researchers that customer satisfaction is a function of customer's expectations and perceived performance. If the performance levels of a product and/or service provider fall below the customer's expectations, the customer will be dissatisfied whereas if the performance levels of a product and/or service provider exceed the customer's expectations, the customer will be satisfied (Karna, 2009). Moreover, since customer satisfaction is the focus of this research and in order to precisely understand this key term, it would be prudent to look into the various definitions of customer satisfaction in the literature. Table 2.2 includes a number of definitions for customer satisfaction by different authors.

Table 2.2: Definitions of Customer Satisfaction (Karna, 2009)

Author	Definition of Customer Satisfaction
Parasuraman *et al.* (1985)	*Customer satisfaction (CS) is a function of perceived quality and disconfirmation – the extent to which perceived quality fails to match repurchase expectations*
Fornell (1992)	*Cumulative customer satisfaction is an overall evaluation based on the total purchase and consumption experience with goods or service over time*
Pmbok (1996)	*CS – understanding, managing, and influencing needs so that customer's expectations are met or exceeded. This requires a combination of conformance to specifications and fitness for use*
Woodruff (1997)	*CS is an overall positive or negative feeling about the net value of services received from a supplier.*
Kotler (2000)	*CS is a person's feelings of pleasure or disappointment resulting from comparing a product's perceived performance (or outcome) to his/her expectations*
Pinto and Rouhiainen (2001)	*CS refers to the idea that a project is only successful if it satisfies the needs of its intended users*
Yasamis *et al.* (2002)	*The customer's satisfaction with the constructed facility, the contracting facility and the contracting service*

Karna (2009) defined customer satisfaction as *'' Customer satisfaction could be determined by the extent to which a physical facility (product) and a construction process (service) meet and/or exceed a customer's expectations''*. In addition, Al-Momani (2000) defined customer satisfaction as *''the gap between what the owner expects and the level of performance they believe is being delivered by the contractors''*. In this research, Karna's and Al-Momani's definition will be utilized whereby customer satisfaction will be measured by determining the degree to which the product and service attributes of a construction project meet and/or exceed the expectations of the customers (Karna, 2009).

2.3 The Strategic Importance of Customer Satisfaction

Whether in the construction industry or not, the customers are basically the bill paying receivers of goods and services. In other words, the customers are the main source of income for any organization and without them the business would not exist. This fact highlights the importance of customers and makes them the most important asset for any organization. It therefore goes without saying that it would be profitable for any organization to strive for achieving customer satisfaction.

Moreover, measuring customer satisfaction plays an important role in improving communication and enabling mutual agreement between parties (Karna, 2009). It is also worth mentioning that complete customer satisfaction is the cornerstone to secure customer loyalty and achieve strong financial performance (Karna, 2009). In a broader sense, customer satisfaction is viewed as an indicator of the future financial success of organizations (Karna, 2009).

There is a consensus among many researchers that customer satisfaction improves profitability and increases market share, repeated sales, and word-of-mouth recommendation (Forsythe, 2007). It is important to note, however, that the pace of change is accelerating whereby the customers of the modern era are much more knowledgeable than ever before and thus products/services are subject to high levels of scrutiny. In addition, the increased global competition has elevated the significance of customer satisfaction in the market. Therefore, organizations should adopt new

management philosophies and develop well-defined strategies to measure and achieve customer satisfaction in order to remain profitable and obtain competitive advantage.

Furthermore, professional organizations measure customer satisfaction to stake out their position whereby these measurements are used in formulating strategies to continuously improve products and services in order to achieve competitive advantage in the market (Karna, 2009). The bottom line is that customer satisfaction is not only important for the success of organizations; it is in fact crucial for the survival of organizations as well.

2.4 The Evolution of Customer Satisfaction in the Construction Industry

Many researchers considered the clients (owners) as the customers of the construction industry. In this research, the customer is defined as the public client (owner) or intermediate client that receives the constructed project from the main contractor. Moreover, the process of constructing a project is viewed as a process that includes product and service components (Maloney, 2002) whereby the level of fulfilling these components are vitally important for achieving customer satisfaction in the construction industry. In construction, customer satisfaction could be measured by determining the degree to which the product and service attributes of a constructed project meet and/or exceed the expectations of the customers (Karna, 2009). This measurement system highlights the fact that understanding the customer's expectation is a prerequisite to achieving customer satisfaction. The contractor understanding of his customers'

expectations is not only important to keep his existing customers but is also important to win new business (Othman, 2015). As cited by Karna et al. (2009), the improved performance of contractors increases customer satisfaction, contractors' reputation, and thus the contractors' competitiveness in the market. Construction firms adopted the total quality management (TQM) approach in the construction industry where this approach focuses on the continuous improvement of customer satisfaction through the production of high quality products with competitive cost, delivery, and service (Othman, 2015). However, it should be noted that the implementation of the total quality management TQM in the construction industry is off the pace. This is due to the perception that the application of the TQM philosophy is limited to the manufacturing industry (Ahmed and Kangari, 1995).

Furthermore, due to the unique and complex nature of construction projects, the construction industry has faced significant problems with regards to producing quality in a customer-oriented manner (Karna et al. 2009). In the recent decade, client satisfaction has been identified as an immense challenge hovering around the construction industry (Karna et al. 2009). As a matter of fact, the importance of customer satisfaction has elevated in importance due to the high demand from customers and due to the fierce competition among contractors as well (Karna, 2009). Several reports have recognized the need for improving customer orientation to achieve customer satisfaction in the construction industry (Karna et al. 2009).

It is worth mentioning that the customers have been identified as the core of the construction process (Forsythe, 2007) where the use of a customer satisfaction approach for measuring performance has been widely emphasized (Karna et al. 2009). In the field of project management, customer satisfaction basically refers to the idea that a project is only successful if it meets the requirements of its intended users (Karna et al. 2009). As a matter of fact, customer satisfaction has become an important tool for assessing performance along with the principal criteria (i.e. cost, time, and quality) (Ahmed and Kangari, 1995; Karna et al. 2009).

2.5 Review of Customer Satisfaction Factors in the Construction Industry

A number of authors including Ahmed and Kangari (1995), Soetanto *et al.* (2001), Karna (2004), Egemen and Mohamed (2006), and Othman (2015) have identified a set of factors/criteria that influence customer satisfaction in the construction industry. It was noticeable that most of the above-mentioned authors have identified their customer satisfaction factors by conducting an in depth literature review and by interviewing and consulting construction professionals about the applicability of these factors in their countries.

Ahmed and Kangari (1995) identified six factors including cost, time, quality, client orientation, communication skills, and response to complaints in order to develop a client-satisfaction model to measure client satisfaction in the US construction arena. They

argued that, when contractors understand their client expectations, they would be able to implement changes and eliminate the root cause of their quality and service problems (Ahmed and Kangari, 1995). Moreover, each of the above-mentioned six factors consisted of a number of attributes where Ahmed and Kangari developed thirty-one customer satisfaction attributes as shown in Table 2.3. Ahmed and Kangari asked the survey respondents (i.e. clients) to mark the importance (on a five-point interval scale) of each factor according to its influence on their satisfaction with the contractors i.e. the influence impact level (Ahmed and Kangari, 1995).

Table 2.3: Ahmed and Kangari's Customer Satisfaction Factors (Ahmed and Kangari, 1995)

Customer Satisfaction Factors	
Timeliness	
1	When requests for work are submitted, provide a reasonable estimate of work and when work will begin.
2	Give the small jobs high priority.
3	Plan and schedule jobs quickly.
4	Once a job is started, complete it quickly.
5	Respond immediately to work status inquiries.
6	Maintain a sense of urgency.
Client Orientation	
7	Display a courteous and helpful attitude.
8	Empathize with my problem, and treat it as an important request.
9	Completely explain policies, procedures, and coordination requirements in advance.
10	Provide assistance and direction for completing paperwork.
Communications	
11	Provide periodic listings of all my work orders and their status.
12	Explain the proposed job prior to starting it.
13	Provide notifications and explanations for work delays.
14	Provide updates on work as it progresses.
15	Explain what was done to solve a particular problem.
16	Follow up to make sure the job was done satisfactorily.
Cost	
17	Conduct value engineering to reduce cost.
18	Employ adequate cost-control measures to stay within budget.
19	Reduce wastes to a minimum.
20	Have adequate financing arrangements.
Response to Complaints	
21	Simplify procedures to lodge complaints.
22	Offer personal attention to complaints.
23	Offer a reasonable explanation for complaints.
24	Treat complaints on completed jobs as priorities.
25	Respond quickly to legitimate complaints.
Quality	
26	Give top priority to the performance characteristics of the facility.
27	Give equal preference to the secondary characteristics or features of the facility.
28	Efforts should he made by the contractor to meet or exceed all specifications or conformance requirements.
29	Ensure the durability of the completed facility as an integral part of contractor functions.
30	Give importance to aesthetics such as how a product feels, sounds, and looks.
31	Perceive quality as an essential dimension of overall client satisfaction.

Al-Momani (2001) used the service quality gap analysis to define and measure client satisfaction in the Jordanian construction industry in order to explore possible ways of project success. Al-Momani (2001) defined owner satisfaction as ‘’*the gap between what the owner expects and the level of performance they believe is being delivered by the contractors”*. Moreover, in order to implement the service quality gap analysis, Al-Momani (2001) identified fifteen attributes that influence client’s satisfaction as shown in Table 2.4. Al-Momani (2001) asked the survey respondents (i.e. clients) to mark their level of expectation and perceived performance of contractors on a five-point interval scale where he used the following satisfaction criteria to analyze the results:

- If expectation is equal to the perceived performance, then the client is said to be ‘’Technically Satisfied’’.
- If the perceived performance exceeds expectation (positive gap), then the client is said to be ‘’Strongly Satisfied’’.
- If the expectation exceeds the perceived performance (negative gap), then the client is said to be ‘’Dissatisfied’’. (Al-Momani, 2000)

Table 2.4: Al-Momani's Customer Satisfaction Attributes (Al-Momani, 2000)

Customer Satisfaction Attributes	
1	Project must be completed on time
2	Project must be carried out within budget
3	Project planning and construction is carried out correctly
4	Considering unforeseen physical and weather conditions in project schedule
5	Project must be flexible to accommodate the primary purpose and new uses at any time
6	Project has good details and quality of design
7	Considering contractual arrangement, exculpatory clauses and legal issues of the contract were a major problem
8	There is an adverse relationship and mistrust between contract team
9	Ensuring that a right people and proper skills are hired on the project
10	Contractors always seek easy alternative solution and tries to save money by using cheap materials
11	There are many rework and deficiencies during construction
12	Considering the contractors experience and number of completed projects are very important
13	Considering financing arrangement is a major problem
14	Decisions are based on cost not on value of work
15	The services and technical ability of the contractor

Soetanto *et al.* (2001) assessed the performance of construction contractors as perceived by owners and consultants in the United Kingdom. They argued that their assessment would provide the contractors with information regarding some aspects of their performance which are causing dissatisfaction to their clients (Soetanto *et al.* 2001). Soetanto *et al.* (2001) assessment used predetermined generic performance criteria that were identified from interviews with construction professionals in the UK construction industry and from the literature review pertinent to contractors' performance. They basically measured perceived importance and perceived performance where the average satisfaction represents the average difference between the perceived performance and the perceived importance (Soetanto *et al.*, 2001). Moreover, in order to conduct their assessment, Soetanto *et al*. (2001) identified forty-eight performance criteria categorized under six headings namely preconstruction stage, construction stage (site management, resource management, site personnel, and variation & drawings), completion stage and ease of delivery, principal criteria (i.e. cost, time, and quality), quality of services, and attitude as shown in Table 2.5.

Soetanto *et al*. (2001) asked the survey respondents (i.e. clients) to mark the importance of each criterion on a 10 point interval scale and then to mark the performance of the contractor on this criterion on a 10 point interval scale whereby the following satisfaction criteria were used to analyze the results:

- If the level of importance is higher than the level of performance, the clients are considered to be ''Dissatisfied''.

- If the level of importance is equal to the level of performance, the clients are considered to be ‘’Optimally Satisfied’’.
- If the level of performance exceeds the level of importance, the clients are considered to be ‘’Satisfied’’. (Soetanto *et al*., 2001)

Furthermore, Soetanto *et al*. (2001) indicated that the results of their assessment would help contractors determine the performance level that is required to satisfy their clients and consultants.

Table 2.5: Soetanto, Proverbs, and Holt Performance Criteria (Soetanto *et al.*, 2001)

A - Pre-construction Stage	
1	First interview and presentation
2	Ability and willingness to help develop brief
3	Contribution to design and build ability of project
4	Plan of work and method statement
5	Understanding of contract and specifications
B - Construction Stage	
Site Management	
6	Site supervision and control
7	Site organization, tidiness and cleanliness
8	Ability to plan and programme properly
9	Health and safety performance/management
10	Compliance to regulations (CDM, etc.)
Resource Management	
11	Material management
12	Manpower management (quantity and quality of craft operatives)
13	Equipment and plant management
14	Management and co-ordination of subcontractors and suppliers
15	Payment to subcontractors and suppliers (on time)
16	Strength of contractor site team (i.e. quantity)
17	Concern/awareness for environmental issues
Site Personnel	
18	Co-operation with client (i.e. client representative)
19	Individual performance and ability
20	Project manager performance and adequacy of authority
21	Site manner (i.e. no loud noises and swearing)
Variations and Drawings	
22	Processing variations (e.g. speed, flexibility)
23	Preparation of shop drawings and as-built drawings
24	Contribution to development of design drawings
C - Completion Stage and Ease of Delivery	
25	Completion of defects
26	Smoothness of operation and hand-over
27	Quality of hand-over documentation (O&M manual, H&S)
28	Ease/speed of settlement of final account
29	Ease of delivery (general feeling on how things went)
D - Principal Criteria	
30	Adherence to schedule (time performance)
31	Adherence to budget (cost performance)
32	Quality of construction and workmanship
E - Quality of Service	
33	Handling of complaints (effectiveness)
34	Telephone inquiries and correspondence
35	Speed and reliability of service
36	Responsiveness to client
37	Ability to make rapid decisions
38	Commitment of key persons (active and continuous)
39	Corporate hospitality
40	Administration
F - Attitude	
41	Honesty and integrity
42	Collaborative/spirit of co-operation/teamwork

Karna (2004) explored customer satisfaction in the Finnish construction industry. He examined empirically the performance of the Finnish construction companies according to the level of customer satisfaction as perceived by the customers. Karna (2004) identified twenty-two (22) customer satisfaction attributes categorized under five headings namely quality assurance and handover procedures, environment and safety at work, functional modes of co-operation, personnel, and site supervision and subcontracts of the contractor as shown in Table 2.6. Karna (2004) asked the survey respondents (i.e. clients) to mark their satisfaction level for each attribute on a five-point interval scale to serve the purpose of his study.

Table 2.6: Karna's Customer Satisfaction Attributes (Karna, 2004)

Customer Satisfaction Attributes	
Quality Assurance and Handover Procedures	
1	Contracted work quality
2	Management and implementation of agreed quality assurance procedures
3	Workability of handover material and maintenance manual
4	Quality of assignment material and maintenance manual
5	Degree of completion at handover inspection
6	Repair of defects and deficiencies noticed during handover inspection
Environment and Safety at Work	
7	Cleanliness and order on site
8	Management of work safety on site
9	Management of environmental issues and related know-how on site
10	Tending to official obligations
Personnel	
14	Skill of supplier's work supervisors
12	Skill of supplier's workers
13	Commitment of supplier's employees to set goals
Cooperation	
14	Capacity of supplier's personnel for co-operation
15	Agreement about changes
16	Tending to notices of defect
17	Information flow on site
18	Access of supplier's employees
19	Quality of overall service level
Site Supervision and Subcontracting	
20	Conformity of supplier's subcontracting to contract
21	Tending to site supervision duties
22	Adherence to schedule in accordance with common agreements

Egemen and Mohamed (2006) presented nine customer satisfaction factors that contribute to achieving full customer satisfaction and lead to possible repetitive works with the client in the Northern Cyprus construction industry. These nine customer satisfaction factors are presented in Table 2.7. Egemen and Mohamed (2006) believed that the framework of their paper would enable the contractor firms to recognize their clients' expectations and thus achieve competitive advantage in the market. Moreover, Egeman and Mohamed (2005) asked the survey respondents (i.e. clients) to mark the importance of each customer factor satisfaction on a five-point interval scale in order to subsequently determine the contribution of these factors to the clients' satisfaction. As a matter of fact, Egeman and Mohamed (2005) calculated the relative indices and ranked the factors to serve the purpose of their research.

Table 2.7: Egemen and Mohamed's Customer Satisfaction Factors (Egemen and Mohamed, 2006)

	Customer Satisfaction Factors
1	The final product's quality and durability
2	The contractor firm finishing the project within the budget scheduled
3	The contractor firm finishing the project on time
4	The contractor firm's attitude & commitment to my needs during project execution
5	The contractor firm's personnel guiding me by their advices through the audit of all decisions taken throughout the project execution
6	The contractor's success in understanding my value system and acting accordingly
7	Responsiveness of the contractor firm (willingness to help the client and provide prompt service)
8	The contractor firm's ability to deal with unanticipated problems during project execution
9	The contractor firm working in harmony with the consultant firm

Othman (2015) developed an international index for customer satisfaction in the construction industry (IICSiC) by identifying forty-five (45) customer satisfaction drivers (i.e. factors) for achieving customer satisfaction in the construction industry. These drivers were classified based on the different phases of a project and based on the categorization of each driver as product or service attributes (Othman, 2015). Moreover, the survey respondents were asked to mark the level of importance of each customer satisfaction driver on a five-point interval scale. As a matter of fact, Othman (2015) calculated the relative importance index for each driver and subsequently ranked the customer satisfaction drivers to serve the purpose of his research.

2.6 Identification of the Customer Satisfaction Factors for Saudi Arabia's Construction Industry

The customer satisfaction factors mentioned in section 2.5 were integrated and categorized under seven (7) headings, namely Timeliness, Client Orientation, Communications, Cost, Quality, Health, Safety & Environment (HS&E), and Site Management as shown in Table 2.8.

Table 2.8: Customer Satisfaction Factors for Saudi Arabia's Construction Industry

Customer Satisfaction Factors for the SA Construction Industry	
A - Timeliness	
1	Plan and schedule jobs (i.e. tasks) promptly
2	Adherence to schedule (time performance)
3	Respond immediately to work status inquiries
4	Maintain a sense of urgency
5	Payment to subcontractors and suppliers (on time)
6	Smoothness of handing over the project
7	Avoid negligence to small jobs (i.e. tasks)
B - Client Orientation	
8	Display a professional approach
9	Empathize with my problem, and treat it as an important request
10	Completely explain policies, procedures, and coordination requirements in advance
11	Provide assistance and direction for completing paperwork
12	Contribution to development of design drawings when required
13	Responsiveness to client issues
14	Proactive to understand client/consultant
15	Attention and Response to complaints
C - Communications	
16	Explain the proposed job (task) prior to starting it (i.e. method statement)
17	Provide notifications and explanations for work delays
18	Providing periodic work progress reports
19	Explain what was done to solve a particular problem
20	Attitude and site manner
21	Telephone inquiries and correspondence

22	Open and honest communication with the client
23	Communicating and interfacing with government authorities to get the necessary approvals for work on site
	D - Cost
24	Apply value engineering to reduce costs
25	Employ adequate cost control measures
26	Have adequate financing arrangements
27	Agreement about changes (i.e. variations)
	E - Quality
28	Efforts made by the contractor to meet or exceed all specifications or conformance requirements
29	Repairing of defects (speed and quality)
30	Quality of hand-over documentation (e.g. Operation & Maintenance Manual)
31	Quality of construction and workmanship
32	Management and implementation of agreed quality assurance and quality control procedures
33	Warranty conditions offered by the contractors
34	Quality of the subcontracted works
35	Degree of completion at handover inspection
36	Quality of shop drawings and as-built drawings
	F – Health, Safety & Environment (HS&E)
37	Site organization, tidiness and cleanliness
38	Concern/awareness for environmental issues
39	Availability of safety training for the job site personnel
40	Accidents investigation and documentation in the site
41	Compliance with local national regulations
42	Compliance with site specific safety regulations

G – Site Management	
43	Site supervision and control
44	Adequacy of contractors resources (material, labor, and equipment)
45	Competency of contractors technical team
46	Minimizing the amount of subcontracted works
47	The contractor firms proactive approach and ability to deal with unanticipated problems during the execution of works
48	The contractor firm working in harmony with the consultant firm

CHAPTER THREE

RESEARCH METHODOLOGY

This chapter includes the research methodology, survey questionnaire structuring, pilot study, target population, and the data gathering techniques used to develop the Customer Satisfaction Index and the Customer Satisfaction Matrix for Saudi Arabia's construction industry. The research strategy adopted in this research will include a combination of quantitative and qualitative techniques to address the research problem. The quantitative techniques include the usage of relative importance index (RII), gap analysis, and customer satisfaction index (CSI). Similarly, the qualitative methods include direct observations, semi structured interviews, and focus groups. The data collection techniques include different channels that include: surveys, literature review, interviews and workshops. The literature review presents the factors influencing customer satisfaction in the construction industry (Ahmed and Kangari, 1995; Al-Momani, 2000;Soetanto *et al.*, 2001;Karna, 2004;Egemen and Mohamed, 2006). Figure 3.1 illustrates the research methodology. In the following, the questionnaire structuring, research population, and data gathering techniques will be presented.

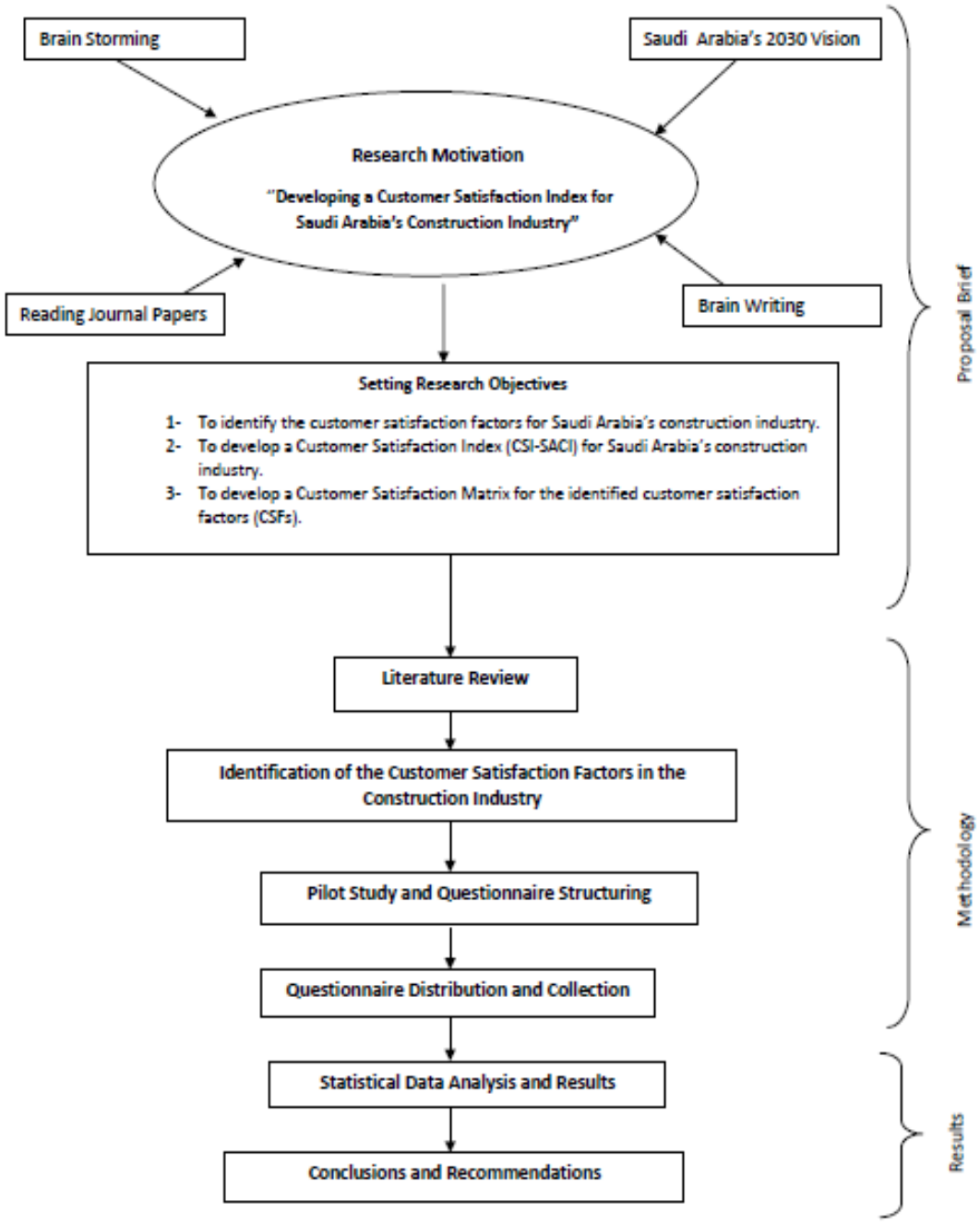


Figure 3.1: Research Methodology

3.1 Questionnaire Structuring

Based on the literature review, the survey questionnaire initially included sixty-one (61) customer satisfaction factors. The factors were subject for intensive review by the research team that includes academicians and practitioners in the construction industry. The applicability of the factors was tested in real life practices from the perspective of participants who mainly worked for a long time in Saudi Arabia. In fact, the draft survey questionnaire was administered to ten (10) senior construction professionals working with clients and consultants in Saudi Arabia. The respondents' feedback provided a valuable input whereby the clarity of the survey questionnaire was significantly improved and the customer satisfaction factors were reduced from sixty-one (61) to forty-eight (48). This effort is considered as the elementary stage of the pilot study. The forty-eight (48) customer satisfaction factors were categorized and presented in the final questionnaire under seven headings, namely: timeliness, client orientation, communications, cost, quality, health, safety & environment (HS&E), and site management. The second part of the pilot phase is geared towards the quality of the questionnaire including phrasing of the questions, format of template, and suggested measuring scale. The questionnaire is attached in the Appendix.

The questionnaire consisted of two parts pertaining to respondents and customer satisfaction factors. The first part of the questionnaire is about the respondent's general information including name of organization, name and position of respondent, years of experience, type of projects implemented, etc. On the other hand, the second part of the questionnaire is about the evaluation of the forty-eight (48) customer satisfaction factors

in the Saudi Arabia's construction industry. The research collects the respondents' feedback on the two main research outputs:

- Customer Satisfaction Index for the Saudi Arabia's Construction Industry (CSI-SACI): For each customer satisfaction factor, the survey respondents were asked about the level of importance and level of satisfaction. A four-point Likert scale was used for the level of importance as follow: level 1 is "Extremely Not Important", level 2 is "Not important", level 3 is "Important" and level 4 is "Extremely Important". Similarly, a four-point Likert scale was used for the level of satisfaction as follow: level 1 is "Extremely Dissatisfied", level 2 is "Dissatisfied", level 3 is "Satisfied" and level 4 is "Extremely Satisfied".

- Customer Satisfaction Matrix (CSM) for Saudi Arabia's Construction Industry based on the Kano model classifications. For each customer satisfaction factor, the survey respondents were asked about their level of expectation where the respondents had four options, namely: ''Not Required'', ''Basic Requirement'', ''More is Better'', and ''Exciting but not a Must''.

The questionnaire also asked the survey respondents about their comments on the survey. In addition, the questionnaire asked the respondents (i.e. clients) to shed light on the aspects that can be improved by the contractors to achieve client satisfaction and build long-term business relationships with the clients in the Saudi construction industry.

3.2 Research Population

The research aims to decide on the level of satisfaction of the clients in the Saudi construction industry. However, it is widely known that a comprehensive list of construction projects owner does not exist in reality as there is no published database records for the industry. As such, the research team decided to target the highly experienced governmental organizations implementing mega projects. This practice is also advocated by similar research in different parts of the world (Al-Shorafa, 2008) due to the fact that the management of mega projects is the main driver to establish the satisfaction index. In Saudi Arabia, all mega projects are sponsored by public subsidized companies. This research targeted the public clients (owners) or intermediate clients that are implementing mega projects (USD 30 million and above) in Saudi Arabia's construction industry. The targeted respondents were senior construction professionals working with local ministries, agencies, municipalities, and governmental organizations in Saudi Arabia.

The clients' list of Saudi Arabia's mega projects was developed based on Saudi Arabia's National Transformation Program 2020 (Saudi Vision 2030, 2016) and Saudi mega projects database (ITP Digital Media Inc., 2017). Thirty public clients were defined as the targeted research population as shown in Table 3.1.

The respondents participating in this research are highly experienced and well-versed in the construction industry. Basically, the survey respondents were senior construction professionals (i.e. vice presidents, general managers, program directors, project

managers, senior project engineers, etc.) working with local ministries, agencies, municipalities, and governmental organizations in Saudi Arabia. In fact, the survey respondents have dealt with a number of contractors in the domain of construction. It therefore goes without saying that the survey respondents are in a good position to evaluate the customer satisfaction factors presented in the survey questionnaire. Twenty-five (25) out of thirty (30) clients responded to the survey questionnaire. It is also worth mentioning that more than one respondent was approached from each client to fill the questionnaire based on his cumulative experience whereby the total number of respondents was 53 as shown in Table 3.1. It was interesting that 92 % of the respondents believed that developing an approach to evaluate client satisfaction would contribute to the success of construction projects. 8 % of the respondents were unsure and none of the respondents believed that developing an approach to evaluate client satisfaction would not contribute to the success of construction projects.

Table 3.1: Target Population

Target Population		# of Respondents
1	Saudi Railway Company	3
2	Ministry of Health	3
3	Ministry of Transportation	2
4	Imam Mohammed Bin Saud Islamic University	3
5	Ma'aden	3
6	MARAFIQ	2
7	MODON	1
8	Royal Commission of Jubail& Yanbu	2
9	SABIC	3
10	Ministry of Housing	3
11	Saudi Aramco	3
12	Saudi Electric Company	3
13	Saline Water Conversion Corporation	1
14	Sipchem	1
15	SADARA	2
16	Saudi Ports Authority	1
17	Al Ra'idahInvestment Company	2
18	King Saud University	1
19	Ministry of Education	3
20	Arriyadh Development Authority	3
21	Saudi Railway Organization	1
22	Public Investment Fund	1
23	Ministry of Finance	3
24	General Organization for Social Insurance	2
25	Saudi Public Pensions Agency	0
26	Saudi Commission for Tourism & Antiquities	1
27	Knowledge Economic City Developers Co. Ltd	0
28	General Authority of Civil Aviation	0
29	Makkah Municipality	0
30	Saudi Trade and Export Development (Tusdeer)	0
Total Number of Respondents		**53**

3.3 Data Gathering

Data were gathered in this research through a structured survey questionnaire whereby the target population was asked to fill the questionnaire to indicate the level of importance of each customer satisfaction factor, the level of satisfaction with the actual performance of their contractors, and the classification of each customer satisfaction factor. Most of the data were obtained through mailing and direct interviews with the clients. Other communication channels were also utilized to fill the survey questionnaire. These channels include mobile technology and video conferencing.

CHAPTER FOUR

CUSTOMER SATISFACTION INDEX FOR SAUDI ARABIA'S CONSTRUCTION INDUSTRY (CSI-SACI)

This chapter will include the steps required to develop the CSI-SACI which can be monitored over time to assess the overall performance of construction contractors in Saudi Arabia. In addition, the results also probe the performance gaps for the CSF groups, namely: timeliness, client orientation, communications, cost, quality, HSE, and site management. The theory and calculations, CSI-SACI results, correlation, and discussions will be presented in the following sections.

4.1 Theory and Calculations

To develop the CSI-SACI, the following steps are followed:

1- Calculate the Relative Importance Index (RII) for each CSF according to Equation 4.1 (Al-Shorafa, 2008).

$$RII = \frac{\sum W}{AN} = \frac{4n_4 + 3n_3 + 2n_2 + 1n_1}{4N} \qquad \text{(Eq. 4.1)}$$

Where

$\mathbf{W}$	is the weight given by the respondents for each customer satisfaction factor (CSF) in the questionnaire. The weighting ranges from 1 to 4.
n_4	is the number of respondents selecting ‘’Extremely Important’’
n_3	is the number of respondents selecting ‘’Important’’
n_2	is the number of respondents selecting ‘’Not Important’’
n_1	is the number of respondents selecting ‘’Extremely Not Important’’
A	is the highest weight (i.e. 4 in this research).
N	is the total number of respondents.

The RII ranges from 0 to 1. A CSF with an RII value closer to 1 is considered to be extremely important whereas a CSF with an RII value closer to 0 is considered to be relatively unimportant.

2- Calculate the CSI-SACI for each category (i.e. timeliness, client orientation, communications, cost, quality, HS&E, and site management) according to Equations 4.2 and 4.3 (Hill *et al.* 2003; Yang and Peng, 2008). The CSI-SACI will be calculated as the sum of multiplication of the average satisfaction rates ($\overline{S_k}$) and the importance weights (W_k) .

$$W_k = \frac{RII_k}{\sum_{k=1}^{N} RII_k} \quad \text{(Eq. 4.2)}$$

$$CSI = \sum_{k=1}^{N} [\overline{S_k} . W_k] \quad \text{(Eq. 4.3)}$$

Where

W_k (Importance weight) is the weight of the k^{th} customer satisfaction factor (CSF). It is basically the ratio between the RII of the k^{th} CSF and the sum of the RIIs of the CSFs in a certain category (i.e. timeliness, client orientation, communications, cost, quality, HS&E, and site management).

$\overline{S_k}$ is the mean of the satisfaction scores expressed by the respondents on the k^{th} customer satisfaction factor (CSF) in the questionnaire.

3- The overall CSI-SACI will be calculated by averaging the CSI-SACI of all categories (i.e. timeliness, client orientation, communications, cost, quality, HS&E, and site management).

4- Calculate the performance gaps as the difference between the expected and perceived levels of performance. This will be calculated for each CSF by subtracting the average satisfaction (perception) scores from the average importance (expectation) scores as shown in Equation 4.4.

$$Peformance\ Gap = \ Perceptions - Expectations \qquad \text{(Eq. 4.4)}$$

In the quality literature, the gap and gap analysis has been widely recognized for identifying and correcting the difference between the customers' expectations and perceptions (Foster, 2013). Similarly, in this research, the criteria used to analyze the gap results will be as follows:

- Positive gap: The client will be satisfied as the level of perceptions is higher than the level of expectations.

- Zero gap: The client will be optimally satisfied as the level of perceptions is equal to the level of expectations.

- Negative gap: The client will be dissatisfied as the level of perceptions is lower than the level of expectations.

The performance gaps quantify the deficiencies of the contractors in each CSF and it represents the need for improvement on a scale of -3 to 3. Negative values reveal that the customers are dissatisfied and thus should receive greater attention. Indeed, the performance gaps will complement the CSI-SACI as it sheds light on the improvement needed by the contractors.

4.2 CSI-SACI Results

This section presents the CSI-SACI results for the timeliness, client orientation, communications, cost, quality, health, safety, and environment (HS&E), and site management groups.

4.2.1 Group A: Timeliness

The timely completion of construction projects is crucial to the clients as well as the contractors in the construction industry. Typically, the public clients implement construction projects to serve the public and boost the economy of their country. The public clients are expected to implement construction projects on time in order to fulfill their commitments with other relevant entities in the government. That being said, any delays in the completion of a project would impose damages on the clients. In other words, when the completion date of a construction project is delayed, the client would suffer losses including direct and indirect costs such as revenues, services, supervision

costs, rental costs, etc. As far as the contractors are concerned, the delayed completion of a construction project would basically impose delay costs such as labor costs, equipment costs, escalation of material prices, insurance and bonds, profit and opportunity costs, etc. It therefore goes without saying that the timely completion of construction projects is imperative for all project participants.

The results pertaining to the timeliness group are shown in Table 4.1 where the CSI-SACI (i.e. 64.73 %) and the performance gaps are presented.

Table 4.1: Timeliness CSI-SACI Results

	Customer Satisfaction Factors	Relative Importance Index (RII)	Importance Weight (W_k)	Avg. Satisfaction Score (Perception) $\overline{(S_k)}$	**CSI-SACI**	Avg. Importance Score (Expectation)	**Performance Gaps**
A - Timeliness							
1	Plan and schedulejobs (i.e. tasks) promptly	0.929	0.16	2.63	0.41	3.77	Negative Gap (-1.14)
2	Adherenceto schedule (time performance)	0.920	0.16	2.37	0.37	3.70	Negative Gap (-1.33)
3	Respond immediately to work status inquiries	0.840	0.14	2.75	0.39	3.33	Negative Gap (-0.59)
4	Maintain a sense of urgency	0.769	0.13	2.75	0.36	3.08	Negative Gap (-0.33)
5	Payment to subcontractor s and suppliers (on time)	0.896	0.15	2.55	0.39	3.66	Negative Gap (-1.11)
6	Smoothness of handing over the project	0.835	0.14	2.55	0.36	3.31	Negative Gap (-0.76)
7	Avoid negligence to small jobs (i.e. tasks)	0.731	0.12	2.57	0.32	2.96	Negative Gap (-0.39)
SUM		5.92			**2.59**		
					64.73%		

4.2.2 Group B: Client Orientation

Due to the unique and complex nature of construction projects, the construction industry has faced significant problems with regards to producing quality in a customer-oriented manner (Karna *et al.*, 2009). Karna *et al.* (2009) mentioned that poor client orientation has resulted in clients' dissatisfaction in many cases. In fact, Karna *et al.* (2009) emphasized that the construction industry is short of producing customer-driven quality. Several other studies have also emphasized that the pace of change is accelerating whereby the production of a customer-driven quality has been elevated in importance and became an essential ingredient for achieving clients' satisfaction.

The results pertaining to the client orientation group are shown in Table 4.2 where the CSI-SACI (i.e. 69.09 %) and the performance gaps are presented.

Table 4.2: Client Orientation CSI-SACI Results

	Customer Satisfaction Factors	Relative Importance Index (RII)	Importance Weight (W_k)	Avg. Satisfaction Score (Perception) $(\overline{S_k})$	CSI-SACI	Avg. Importance Score (Expectation)	Performance Gaps
B- Client Orientation							
8	Display a professional approach	0.882	0.13	2.75	0.36	3.51	Negative Gap (-0.77)
9	Empathize with my problem, and treat it as an important request	0.783	0.12	2.84	0.33	3.17	Negative Gap (-0.33)
10	Completely explain policies, procedures, and coordination requirements in advance	0.854	0.13	2.71	0.35	3.47	Negative Gap (-0.76)
11	Provide assistance and direction for completing paperwork	0.745	0.11	2.86	0.32	3.12	Negative Gap (-0.26)
12	Contribution to development of design drawings when required	0.835	0.12	2.77	0.35	3.40	Negative Gap (-0.63)
13	Responsiveness to client issues	0.887	0.13	2.87	0.38	3.55	Negative Gap (-0.67)
14	Proactive to understand client/consultant	0.840	0.13	2.71	0.34	3.41	Negative Gap (-0.70)
15	Attention and Response to complaints	0.868	0.13	2.62	0.34	3.43	Negative Gap (-0.81)
SUM		6.69			**2.76**		
					69.09%		

4.2.4 Group C: Communications Group

Communication is ‘’the sharing of information between two or more individuals or groups to reach a common understanding’’ (Jones and George, 2011). Good communication is one of the key ingredients for any contractor who wants to achieve a competitive advantage in the construction market.

The results pertaining to the communications group are shown in Table 4.3 where the CSI-SACI (i.e. 67.88 %) and the performance gaps are presented.

Table 4.3: Communications CSI-SACI Results

Customer Satisfaction Factors		Relative Importance Index (RII)	Importance Weight (W_k)	Avg. Satisfaction Score (Perception) $\overline{(S_k)}$	CSI-SACI	Avg. Importance Score (Expectation)	Performance Gaps
C- Communications							
16	Explain the proposed job (task) prior to starting it (i.e. method statement)	0.854	0.13	2.83	0.35	3.43	Negative Gap (-0.61)
17	Provide notifications and explanations for work delays	0.896	0.13	2.48	0.33	3.62	Negative Gap (-1.14)
18	Providing periodic work progress reports	0.877	0.13	2.70	0.35	3.45	Negative Gap (-0.75)
19	Explain what was done to solve a particular problem	0.759	0.11	2.75	0.31	3.15	Negative Gap (-0.40)
20	Attitude and site manner	0.849	0.12	2.83	0.35	3.39	Negative Gap (-0.56)
21	Telephone inquiries and correspondence	0.783	0.11	3.01	0.35	3.16	Negative Gap (-0.15)
22	Open and honest communication with the client	0.892	0.13	2.63	0.34	3.60	Negative Gap (-0.97)
23	Communicating and interfacing with government authorities to get the necessary approvals for work on site	0.901	0.13	2.55	0.34	3.65	Negative Gap (-1.09)
SUM		6.81			**2.72**		
					67.88%		

4.2.4 Group D: Cost

One of the traditional success factors of construction projects is delivering the project at the agreed contract price. Therefore, the contractors cost performance is indeed viewed as one of the central factors for achieving client satisfaction in the construction industry.

The results pertaining to the cost group are shown in Table 4.4 where the CSI-SACI (i.e. 63.50 %) and the performance gaps are presented.

Table 4.4: Cost CSI-SACI Results

Customer Satisfaction Factors		Relative Importance Index (RII)	Importance Weight (W_k)	Avg. Satisfaction Score (Perception) $\overline{(S_k)}$	CSI-SACI	Avg. Importance Score (Expectation)	Performance Gaps
D- Cost							
24	Apply value engineering to reduce costs	0.882	0.25	2.36	0.60	3.53	Negative Gap (-1.17)
25	Employ adequate cost control measures	0.877	0.25	2.49	0.63	3.49	Negative Gap (-1.00)
26	Have adequate financing arrangements	0.849	0.24	2.65	0.65	3.44	Negative Gap (-0.79)
27	Agreement about changes (i.e. variations)	0.858	0.25	2.67	0.66	3.49	Negative Gap (-0.81)
SUM		3.47			2.54		
					63.50 %		

4.2.5 Group E: Quality

There is no doubt that the quality of the products and services provided by the contractors are considered cornerstones for achieving client satisfaction in the construction industry. The traditional definition of quality was the suppliers/contractors conformance to numeric specifications (Foster, 2013). However, this definition is limited to the quality of products because it is almost impossible for services (i.e. intangibles) to conform to numeric specifications (Foster, 2013). Therefore, the traditional definition has been extended by several quality theorists to include the customers' perceptions. In broader view, if the clients are satisfied, the products and services are considered to have good quality. In the field of construction, Maloney (2002) stressed that construction projects include both product and service quality attributes. In addition, Karna (2009) mentioned that the services provided by the contractors in the domain of construction are becoming an integral part of the construction process. The emergence of a service culture in the construction industry basically fosters client orientation and as a result client satisfaction.

The results pertaining to the quality group are shown in Table 4.5 where the CSI-SACI (i.e. 66.35 %) and the performance gaps are presented.

Table 4.5: Quality CSI-SACI Results

	Customer Satisfaction Factors	Relative Importance Index (RII)	Importance Weight (W_k)	Avg. Satisfaction Score (Perception) $(\overline{S_k})$	CSI-SACI	Avg. Importance Score (Expectation)	Performance Gaps
E- Quality							
28	Efforts made by the contractor to meet or exceed all specifications or conformance requirements	0.873	0.11	2.57	0.29	3.53	Negative Gap (-0.97)
29	Repairing of defects (speed and quality)	0.868	0.11	2.67	0.30	3.49	Negative Gap (-0.81)
30	Quality of hand-over documentation (e.g. Operation & Maintenance Manual)	0.882	0.11	2.63	0.29	3.55	Negative Gap (-0.92)
31	Quality of construction and workmanship	0.901	0.11	2.73	0.31	3.65	Negative Gap (-0.91)
32	Management and implementation of agreed quality assurance and quality control procedures	0.868	0.11	2.59	0.29	3.45	Negative Gap (-0.86)
33	Warranty conditions offered by the contractors	0.849	0.11	2.83	0.31	3.40	Negative Gap (-0.57)
34	Quality of the subcontracted works	0.896	0.11	2.52	0.29	3.57	Negative Gap (-1.05)
35	Degree of completion at handover inspection	0.844	0.11	2.69	0.29	3.41	Negative Gap (-0.72)
36	Quality of shop drawings and as-built drawings	0.877	0.11	2.66	0.30	3.51	Negative Gap (-0.85)
SUM		7.86			**2.65**		
					66.35 %		

4.2.6 Group F: Health, Safety and Environment (HS&E)

A number of definitions of safety programs were put forward by different researchers. Anton (1989) defined a safety program as ‘‘the control of the working environment, equipment, processes, and the workers for the purpose of reducing accidental injuries and losses in the workplace.’’. It is worth mentioning that the construction industry has the highest rate of accidents, fatalities, and disabling injuries among all industries (Sawacha *et al.*, 1999).

The results pertaining to the health, safety and environment (HS&E) group are shown in Table 4.6 where the CSI-SACI (i.e. 66.65 %) and the performance gaps are presented.

Table 4.6: HS&E CSI-SACI Results

	Customer Satisfaction Factors	Relative Importance Index (RII)	Importance Weight (W_k)	Avg. Satisfaction Score (Perception) $(\overline{S_k})$	CSI-SACI	Avg. Importance Score (Expectation)	Performance Gaps
F – Health, Safety & Environment (HS&E)							
37	Site organization, tidiness and cleanliness	0.901	0.17	2.74	0.46	3.60	Negative Gap (-0.86)
38	Concern/awareness for environmental issues	0.868	0.16	2.62	0.43	3.50	Negative Gap (-0.88)
39	Availability of safety training for the job site personnel	0.887	0.17	2.57	0.43	3.55	Negative Gap (-0.99)
40	Accidents investigation and documentation in the site	0.863	0.16	2.62	0.43	3.47	Negative Gap (-0.85)
41	Compliance with local national regulations	0.887	0.17	2.77	0.46	3.53	Negative Gap (-0.75)
42	Compliance with site specific safety regulations	0.906	0.17	2.67	0.46	3.59	Negative Gap (-0.91)
SUM		5.31			**2.67**		
					66.65 %		

4.2.7 Group G: Site Management

Site management refers to the idea of managing the construction activities. It is basically the process of planning, organizing, leading, and controlling of material, manpower, equipment, and money to achieve the desired goals. Improper site management would certainly impact the projects' cost, time, quality, and safety. It therefore goes without saying that site management has a high influence on projects success and thus client satisfaction.

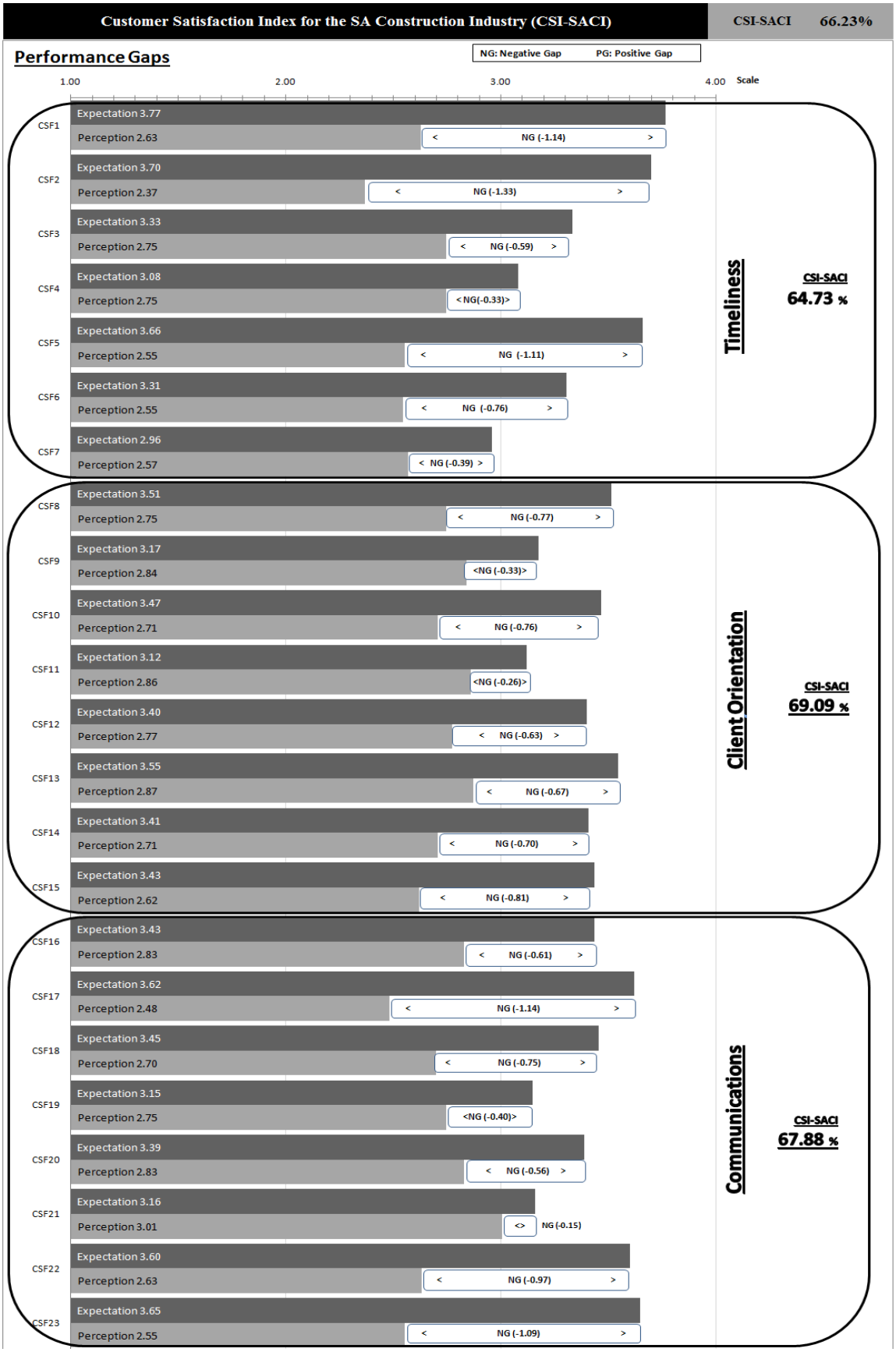
The results pertaining to the site management group are shown in Table 4.7 where the CSI-SACI (i.e. 65.45 %) and the performance gaps are presented.

Table 4.7: Site Management CSI-SACI Results

	Customer Satisfaction Factors	Relative Importance Index (RII)	Importance Weight (W_k)	Avg. Satisfaction Score (Perception) $(\overline{S_k})$	CSI-SACI	Avg. Importance Score (Expectation)	Performance Gaps
G- Site Management							
43	Site supervision and control	0.948	0.18	2.84	0.52	3.79	Negative Gap (-0.95)
44	Adequacy of contractors resources (material, labor, and equipment)	0.910	0.18	2.49	0.44	3.67	Negative Gap (-1.18)
45	Competency of contractors technical team	0.868	0.17	2.63	0.45	3.44	Negative Gap (-0.81)
46	Minimizing the amount of subcontracted works	0.722	0.14	2.60	0.37	2.90	Negative Gap (-0.30)
47	The contractor firms proactive approach and ability to deal with unanticipated problems during the execution of works	0.825	0.16	2.39	0.38	3.29	Negative Gap (-0.91)
48	The contractor firm working in harmony with the consultant firm	0.858	0.17	2.73	0.46	3.53	Negative Gap (-0.79)
	SUM	5.13			**2.62**		
					65.45 %		

4.2.8 Overall CSI-SACI

The overall CSI-SACI was calculated by averaging the CSI-SACI of all categories (i.e. timeliness, client orientation, communications, cost, quality, HSE, and site management.). The overall CSI-SACI (i.e. 66.23 %) along with the performance gaps is presented in Figure 4.1.


Customer Satisfaction Index for the SA Construction Industry (CSI-SACI)
CSI-SACI 66.23%
Performance Gaps
NG: Negative Gap
PG: Positive Gap
1.00
2.00
3.00
4.00
Scale
CSF1 Expectation 3.77 Perception 2.63 NG (-1.14)
CSF2 Expectation 3.70 Perception 2.37 NG (-1.33)
CSF3 Expectation 3.33 Perception 2.75 NG (-0.59)
CSF4 Expectation 3.08 Perception 2.75 NG(-0.33)
CSF5 Expectation 3.66 Perception 2.55 NG (-1.11)
CSF6 Expectation 3.31 Perception 2.55 NG (-0.76)
CSF7 Expectation 2.96 Perception 2.57 NG (-0.39)
Timeliness
CSI-SACI 64.73 %
CSF8 Expectation 3.51 Perception 2.75 NG (-0.77)
CSF9 Expectation 3.17 Perception 2.84 NG (-0.33)
CSF10 Expectation 3.47 Perception 2.71 NG (-0.76)
CSF11 Expectation 3.12 Perception 2.86 NG (-0.26)
CSF12 Expectation 3.40 Perception 2.77 NG (-0.63)
CSF13 Expectation 3.55 Perception 2.87 NG (-0.67)
CSF14 Expectation 3.41 Perception 2.71 NG (-0.70)
CSF15 Expectation 3.43 Perception 2.62 NG (-0.81)
Client Orientation
CSI-SACI 69.09 %
CSF16 Expectation 3.43 Perception 2.83 NG (-0.61)
CSF17 Expectation 3.62 Perception 2.48 NG (-1.14)
CSF18 Expectation 3.45 Perception 2.70 NG (-0.75)
CSF19 Expectation 3.15 Perception 2.75 NG (-0.40)
CSF20 Expectation 3.39 Perception 2.83 NG (-0.56)
CSF21 Expectation 3.16 Perception 3.01 NG (-0.15)
CSF22 Expectation 3.60 Perception 2.63 NG (-0.97)
CSF23 Expectation 3.65 Perception 2.55 NG (-1.09)
Communications
CSI-SACI 67.88 %

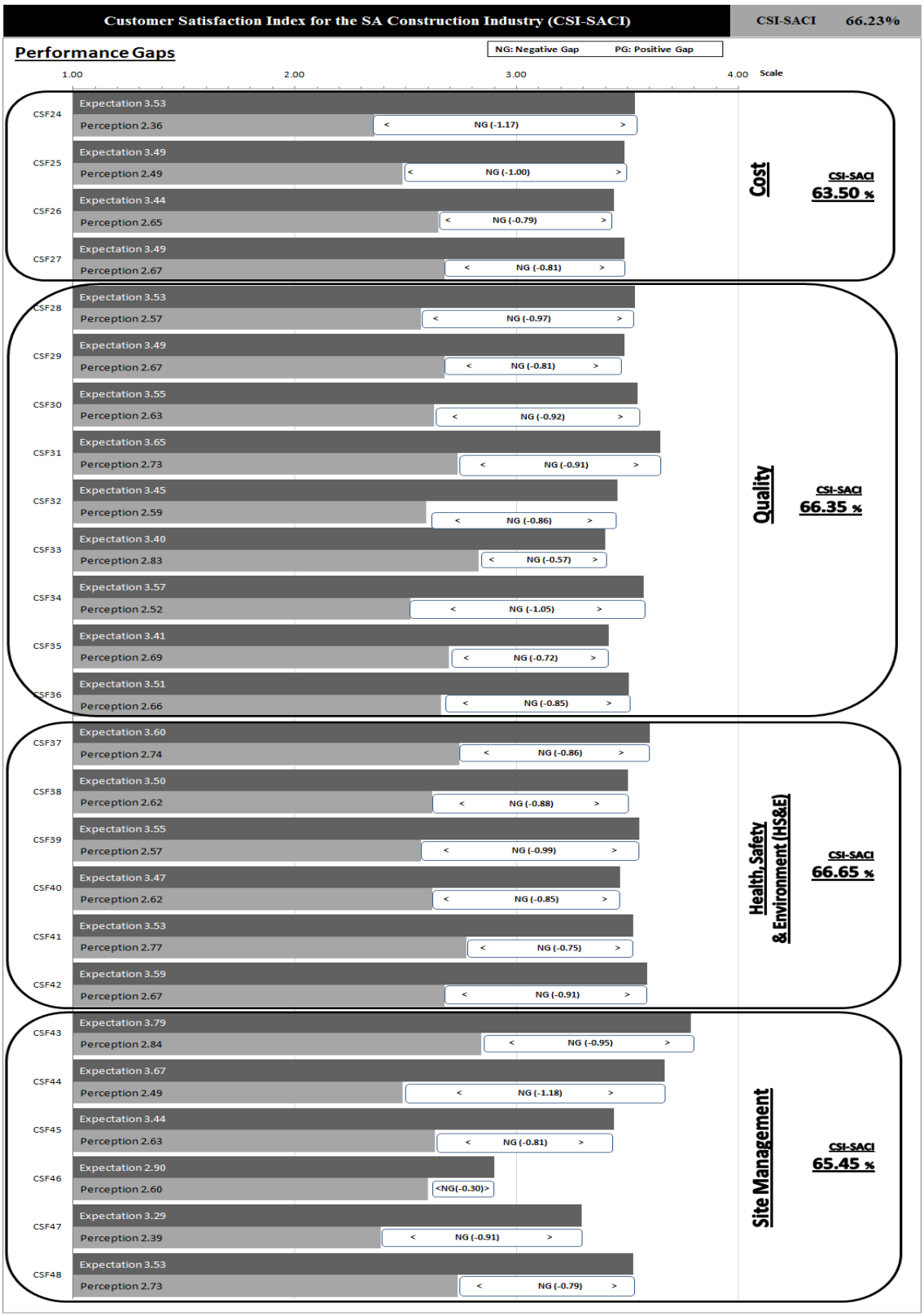


Figure 4.1: Overall CSI-SACI

4.3 Pearson's Correlation between the Customer Satisfaction Factors

The population Pearson correlation coefficients were calculated using computer software spreadsheets in order to determine the existence of a relationship between the CSFs in the timeliness, client orientation, communications, cost, quality, health, safety & management, and site management groups. Typically, the correlation values range from -1 to 1 where a value of 1 indicates a strong positive linear correlation, a value of 0 indicates no linear correlation, and a value of -1 indicates a strong negative linear correlation.

The correlation between the CSFs in the relevant groups will be presented in the following sections.

4.3.1 Group A: Timeliness

Table 4.8: Correlation of Group A CSFs

	CSF 1	*CSF2*	*CSF3*	*CSF4*	*CSF5*	*CSF6*	*CSF7*
CSF 1	1						
CSF2	0.671785	1					
CSF3	0.383734	0.482065	1				
CSF4	0.431676	0.565562	0.415642	1			
CSF5	0.387275	0.434586	0.313158	0.382762	1		
CSF6	0.367351	0.388811	0.334048	0.292002	0.367674	1	
CSF7	0.212337	0.328458	0.264343	0.285535	0.316375	0.356715	1

4.3.2 Group B: Client Orientation

Table 4.9: Correlation of Group B CSFs

	CSF8	*CSF9*	*CSF10*	*CSF11*	*CSF12*	*CSF13*	*CSF14*	*CSF15*
CSF8	1							
CSF9	0.114687	1						
CSF10	0.368318	0.208977	1					
CSF11	0.172635	0.332823	0.244856	1				
CSF12	0.205324	-0.10039	0.2738	0.143269	1			
CSF13	0.445147	0.281175	0.272623	0.567268	0.276845	1		
CSF14	0.282361	0.2989	0.370273	0.246084	0.103465	0.427464	1	
CSF15	0.271254	0.22818	0.400225	0.235944	0.088294	0.396372	0.480491	1

4.3.3 Group C: Communications

Table 4.10: Correlation of Group C CSFs

	CSF16	*CSF17*	*CSF18*	*CSF19*	*CSF20*	*CSF21*	*CSF22*	*CSF23*
CSF16	1							
CSF17	0.389457	1						
CSF18	0.274391	0.42685	1					
CSF19	0.271704	0.408969	0.271848	1				
CSF20	0.339054	0.45447	0.184532	0.260826	1			
CSF21	0.304099	0.331614	0.394016	0.266633	0.333627	1		
CSF22	0.436772	0.499137	0.475041	0.436072	0.49807	0.277821	1	
CSF23	0.405766	0.481199	0.405115	0.273123	0.531766	0.378987	0.527446	1

4.3.4 Group D: Cost

Table 4.11: Correlation of Group D CSFs

	CSF24	*CSF25*	*CSF26*	*CSF27*
CSF24	1			
CSF25	0.657983	1		
CSF26	0.483215	0.589558	1	
CSF27	0.540185	0.44076	0.425671	1

4.3.5 Group E: Quality

Table 4.12: Correlation of Group E CSFs

	CSF28	*CSF29*	*CSF30*	*CSF31*	*CSF32*	*CSF33*	*CSF34*	*CSF35*	*CSF36*
CSF28	1								
CSF29	0.580971	1							
CSF30	0.427394	0.401086	1						
CSF31	0.528797	0.520184	0.488622	1					
CSF32	0.661163	0.484603	0.411435	0.499687	1				
CSF33	0.42279	0.331348	0.543643	0.418261	0.654264	1			
CSF34	0.653765	0.527918	0.566656	0.653439	0.551949	0.438202	1		
CSF35	0.422954	0.282144	0.538293	0.611136	0.583072	0.530006	0.641271	1	
CSF36	0.312497	0.091639	0.421619	0.429747	0.432299	0.557463	0.337643	0.57729	1

4.3.6 Group F: Health, Safety & Environment (HS&E)

Table 4.13: Correlation of Group F CSFs

	CSF37	*CSF38*	*CSF39*	*CSF40*	*CSF41*	*CSF42*
CSF37	1					
CSF38	0.592525	1				
CSF39	0.422698	0.554702	1			
CSF40	0.499906	0.549457	0.572169	1		
CSF41	0.459714	0.386273	0.389299	0.638847	1	
CSF42	0.541341	0.612247	0.566634	0.649256	0.737717	1

4.3.7 Group G: Site Management

Table 4.14: Correlation of Group G CSFs

	CSF43	*CSF44*	*CSF45*	*CSF46*	*CSF47*	*CSF48*
CSF43	1					
CSF44	0.678623	1				
CSF45	0.627564	0.535271	1			
CSF46	0.317451	0.460279	0.28327	1		
CSF47	0.46768	0.331772	0.439232	0.25851	1	
CSF48	0.29203	0.202245	0.427597	0.351853	0.470204	1

4.4 Discussions

This section will discuss the results that were presented in sections 4.2 (CSI-SACI Results) and 4.3 (Correlation between the CSF Groups).

4.4.1 Discussions of the CSI-SACI Results

The overall CSI-SACI score was 66.23 %. Moreover, it was observed that the highest CSI-SACI score (i.e. 69.09 %) was for the client orientation group. On the other hand, the lowest CSI-SACI score (i.e. 63.5 %) was for the cost group. The ranking of the CSF groups based on their CSI-SACI score is as follows:

1- Group B: Client Orientation	69.09 %
2- Group C: Communications	67.88 %
3- Group F: Health, Safety & Environment	66.65 %
4- Group E: Quality	66.35 %
5- Group G: Site Management	65.45 %
6- Group A: Timeliness	64.73 %
7- Group D: Cost	63.5 %

Figure 4.2 shows a graphical representation of the CSI-SACI scores for the CSF groups.

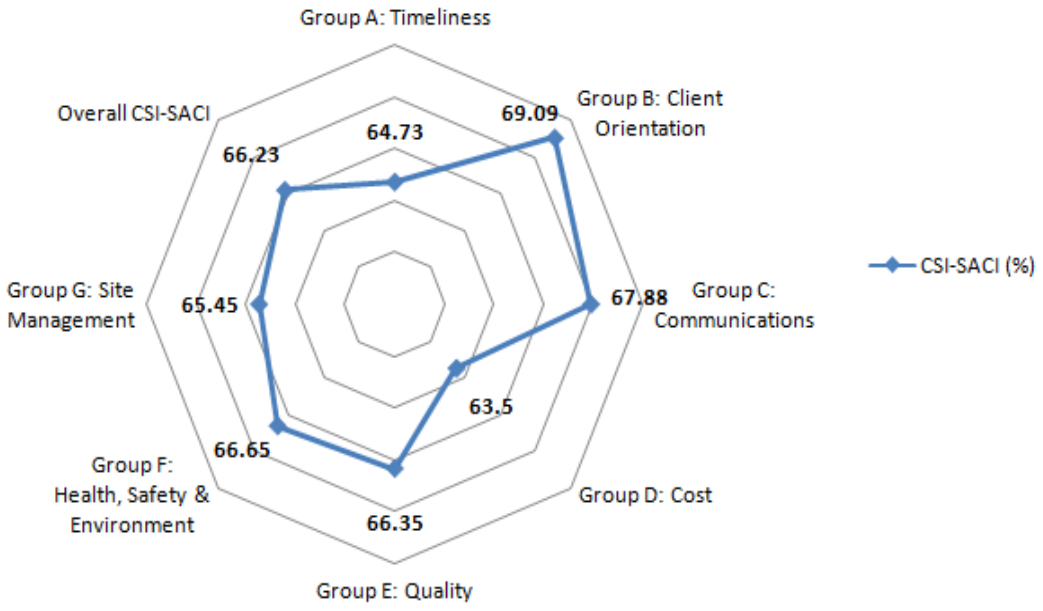


Figure 4.2: Graphical Representation of the CSI-SACI Scores

The CSI-SACI score can be monitored over time to assess the overall performance of construction contractors in Saudi Arabia. Therefore, the CSI-SACI score serves as a base (reference) for comparison with future indices to monitor the contractors' performance over time.

As mentioned in the introduction of this chapter, the CSI-SACI results include the performance gaps where the identifications of the gaps provide a profound understanding of the customers' satisfaction/dissatisfaction. The negative performance gaps presented in section 4.2 reveal that, in general, the public clients are dissatisfied with the performance of construction contractors in Saudi Arabia.

Moreover, in order to determine which CSFs are most causing dissatisfaction and thus require immediate corrective action and improvement, it would be prudent to rank the performance gaps in ascending order where the most negative gap is ranked highest as it should receive greater attention for achieving customer satisfaction. The priority rank of the performance gaps is shown in Table 4.15.

Table 4.15: Priority Rank of the Performance Gaps

CSF No.	Customer Satisfaction Factor (CSF)	Performance Gaps	Priority Rank
2	Adherence to schedule (time performance)	-1.33	1
44	Adequacy of contractors resources (material, labor, and equipment)	-1.18	2
24	Apply value engineering to reduce costs	-1.17	3
17	Provide notifications and explanations for work delays	-1.14	4
1	Plan and schedule jobs (i.e. tasks) promptly	-1.14	5
5	Payment to subcontractors and suppliers (on time)	-1.11	6
23	Communicating and interfacing with government authorities to get the necessary approvals for work on site	-1.09	7
34	Quality of the subcontracted works	-1.05	8
25	Employ adequate cost control measures	-1.00	9
39	Availability of safety training for the job site personnel	-0.99	10
28	Efforts made by the contractor to meet or exceed all specifications or conformance requirements	-0.97	11
22	Open and honest communication with the client	-0.97	12
43	Site supervision and control	-0.95	13
30	Quality of hand-over documentation (e.g. Operation & Maintenance Manual)	-0.92	14
31	Quality of construction and workmanship	-0.91	15
42	Compliance with site specific safety regulations	-0.91	16
47	The contractor firms proactive approach and ability to deal with unanticipated problems during the execution of works	-0.91	17
38	Concern/awareness for environmental issues	-0.88	18
32	Management and implementation of agreed quality assurance and quality control procedures	-0.86	19
37	Site organization, tidiness and cleanliness	-0.86	20
36	Quality of shop drawings and as-built drawings	-0.85	21
40	Accidents investigation and documentation in the site	-0.85	22
15	Attention and Response to complaints	-0.81	23
27	Agreement about changes (i.e. variations)	-0.81	24
29	Repairing of defects (speed and quality)	-0.81	25
45	Competency of contractors technical team	-0.81	26

48	The contractor firm working in harmony with the consultant firm	-0.79	27
26	Have adequate financing arrangements	-0.79	28
8	Display a professional approach	-0.77	29
10	Completely explain policies, procedures, and coordination requirements in advance	-0.76	30
6	Smoothness of handing over the project	-0.76	31
41	Compliance with local national regulations	-0.75	32
18	Providing periodic work progress reports	-0.75	33
35	Degree of completion at handover inspection	-0.72	34
14	Proactive to understand client/consultant	-0.70	35
13	Responsiveness to client issues	-0.67	36
12	Contribution to development of design drawings when required	-0.63	37
16	Explain the proposed job (task) prior to starting it (i.e. method statement)	-0.61	38
3	Respond immediately to work status inquiries	-0.59	39
33	Warranty conditions offered by the contractors	-0.57	40
20	Attitude and site manner	-0.56	41
19	Explain what was done to solve a particular problem	-0.40	42
7	Avoid negligence to small jobs (i.e. tasks)	-0.39	43
9	Empathize with my problem, and treat it as an important request	-0.33	44
4	Maintain a sense of urgency	-0.33	45
46	Minimizing the amount of subcontracted works	-0.30	46
11	Provide assistance and direction for completing paperwork	-0.26	47
21	Telephone inquiries and correspondence	-0.15	48

It was observed that the CSFs having the top 5 priority ranks are: adherence to schedule (time performance), adequacy of contractors' resources (material, labor, and equipment), apply value engineering to reduce costs, provide notifications and explanations for work delays, and plan and schedule jobs (i.e. tasks) promptly. This indicates that the clients are very much concerned about the traditional objective measures (i.e. cost, time, and quality). The results also indicate a significant room for improvement in these CSFs.

On the other hand, the CSFs having the bottom 5 priority ranks are: empathize with my problem and treat it as an important request, maintain a sense of urgency, minimizing the amount of subcontracted works, provide assistance and direction for completing paperwork, telephone inquiries and correspondence.

The low priority rank (i.e. 44) of CSF 9 (Empathize with my problem and treat it as an important request) makes sense as most of the clients do not expect the contractors to empathize with their personal problems.

Moreover, the low priority rank (i.e. 45) of CSF 9 (Maintain a sense of urgency) makes sense as the clients are more concerned about the contractors' adherence to the project's schedule.

In addition, it was interesting that the priority rank of CSF 46 (Minimizing the amount of subcontracted works) was low (i.e. 46). As a matter of fact, the rationale behind this factor was that clients may want most of the work done by the contractors (not the

subcontractors) in order to ensure quality. However, the low priority rank was somewhat expected because typically the clients appoint consultants to supervise the implementation and ensure the quality of construction.

Furthermore, the priority rank of CSF 11 (Provide assistance and direction for completing paperwork) was low (i.e. 47). Perhaps, the clients do not really expect the contractors to do the paperwork for them.

Finally, CSF 21 (Telephone inquiries and correspondence) was ranked the lowest (i.e. 48) and this makes sense as telephone calls are considered informal and may disrupt the flow of formal communications.

Similar to this research, Soetanto *et al.*, (2001) and Al-Momani (2000) assessed the performance of the construction contractors in the United Kingdom and Jordan, respectively, to highlight the performance aspects that are causing dissatisfaction to the clients and shed light on the areas that require attention and corrective action. As mentioned in section 2.5, Soetanto *et al.*, (2001) and Al-Momani (2000) measured the importance (expectations) and the performance (perceptions) where the gap represents the difference between the average performance and the average importance scores.

The results (i.e. priority ranks of the performance gaps) of this research were compared with the results of the studies conducted by Soetanto *et al.*, (2001) and Al-Momani

(2000). The comparison of the CSFs having the top 5 priority ranks in Saudi Arabia, United Kingdom, and Jordanian construction industry is presented in Table 4.16.

Table 4.16: Comparison of Top 5 Priority Ranks with Other Studies

Top 5 Priority Ranks			
Priority Rank	**Saudi Arabia CSFs (Al-Sagga)**	**United Kingdom CSFs (Soetanto *et al.*, 2001)**	**Jordan CSFs (Al-Momani , 2000)**
1	Adherence to schedule (time performance)	‘’Completion of defects’’	‘’Project must be carried out within budget’’
2	Adequacy of contractors resources (material, labor, and equipment)	‘’Adherence to schedule (time performance)’’	‘’The contractor will seek alternative solution with less emphasis on cost’’
3	Apply value engineering to reduce costs	‘’Payment to subcontractors and suppliers (on time)’’	‘’Project must be flexible to accommodate the primary purpose and new uses at any time’’
4	Provide notifications and explanations for work delays	Adherence to budget (cost performance)	‘’Project planning and construction is carried out correctly’’
5	Plan and schedule jobs (i.e. tasks) promptly	‘’Ability to plan and programme properly’’	‘’The project will have no deficiencies and rework during construction’’

It was observed that there are many similarities among the CSFs having the top five priority ranks in Saudi Arabia, United Kingdom, and Jordan. For instance, the comparison of the priority ranks revealed that the clients in Saudi Arabia and the United Kingdom are very much concerned about the contractors' adherence to schedule where the priority rank of the CSF related to time performance was among the top five priority ranks in Saudi Arabia and the United Kingdom (i.e. first in Saudi Arabia and second in the United Kingdom).

Moreover, the comparison of the priority ranks revealed that the clients in Saudi Arabia and Jordan are very much concerned about applying value engineering to reduce costs where the priority rank of the CSF related to value engineering was among the top five priority ranks in Saudi Arabia and Jordan (i.e. third in Saudi Arabia and second in Jordan).

In addition, the comparison of the priority ranks revealed that the clients in Saudi Arabia, United Kingdom, and Jordan are concerned about planning and scheduling jobs promptly where the priority rank of the CSF related to planning and scheduling was among the top five priority ranks in Saudi Arabia, United Kingdom, and Jordan (fifth in Saudi Arabia and the United Kingdom, and fourth in Jordan).

The comparison of the CSFs having the bottom 5 priority ranks in Saudi Arabia, United Kingdom, and Jordanian construction industry are presented in Table 4.17.

Table 4.17: Comparison of Bottom 5 Priority Ranks with Other Studies

Bottom 5 Priority Ranks			
Priority Rank	**Saudi Arabia CSFs (Al-Sagga)**	**United Kingdom CSFs (Soetanto *et al.*, 2001)**	**Jordan CSFs (Al-Momani , 2000)**
48	Telephone inquiries and correspondence	‘’Corporate hospitality’’	‘’Considering unforeseen physical and weather conditions in project schedule’’
47	Provide assistance and direction for completing paperwork	‘’Ability and willingness to help develop brief’’	‘’Ensuring that a right people and proper skills are hired on the project’’
46	Minimizing the amount of subcontracted works	‘’First interview and presentation’’	‘’Financing arrangement’’
45	Maintain a sense of urgency	‘’Contribution to design and buildability of project’’	‘’Project must be completed on time’’
44	Empathize with my problem, and treat it as an important request	‘’Material Management’’	‘’The services and technical ability of the contractor’’

It was observed that there are no similarities among the CSFs having the bottom five priority ranks in Saudi Arabia, United Kingdom, and Jordan. This was expected as the priorities and perspectives of clients vary from one country to another.

4.4.2 Discussions of the Correlation between the CSF Groups

The population Pearson correlation between the CSFs in the timeliness, client orientation, communications, cost, quality, health, safety & environment (HS&E), and site management groups were presented in section 4.3.

The CSFs having correlation values of more than 0.5 where highlighted in Table 4.8, Table 4.9, Table 4.10, Table 4.11, Table 4.12, Table 4.13, and Table 4.14 where these values indicate the existence of a strong positive correlation between the CSFs in the relevant groups. For instance the population Pearson correlation coefficient between CSF 24 (Apply value engineering to reduce costs) and CSF 25 (Employ adequate cost control measures) was 0.658. This indicates the existence of a strong positive correlation between these two CSFs. The merit of conducting this exercise is to help the contractors focus their improvement effort on a group of highly correlated CSFs rather than improving each CSF individually.

CHAPTER FIVE

CUSTOMER SATISFACTION MATRIX (CSM) FOR SAUDI ARABIA'S CONSTRUCTION INDUSTRY

This chapter will include the steps required to develop the CSM. The CSM will be developed based on the Kano model classifications. In 1984, Noriaki Kano developed the Kano model which is basically a theory of product development and customer satisfaction (Juan *et al.*, 2014). Kano's model classifies the customer's preferences into five categories namely Must-Be, One-Dimensional, Attractive Indifferent, and Reverse where these five categories can be described as follows:

- Must-be Attribute: Attributes that are expected by the customers and the customer would be dissatisfied if they were not fulfilled (i.e. basic requirements).
- One-dimensional Attribute: Attributes that are considered performance attributes where better performance leads to a linear increase in customer satisfaction (i.e. more is better).
- Attractive Attribute: Attributes that are not expected but can result in great customer satisfaction if available (i.e. exciting but not a must).

- Indifferent Attribute: Attributes that are not considered important for the customers and thus has no effect on customer satisfaction (i.e. not required).
- Reverse Attribute: Attributes that are opposite to the one-dimensional attributes where a higher degree of achievement results in customer dissatisfaction (Juan *et al.*, 2014).

This classification provides an understanding of the product/service attributes which are perceived as being important to achieve customer satisfaction. The CSM will prioritize the identified customer satisfaction factors based on their influence on customer satisfaction and customer dissatisfaction in Saudi Arabia's construction industry. The theory and calculations, results, and discussions will be presented in the following sections.

5.1 Theory and Calculations

To develop the CSM, the following steps are followed:

1- Calculate the customer satisfaction coefficients (CSC) and customer dissatisfaction coefficients (CDC) for each of the 48 customer satisfaction factors (CSF) according to Equations 5.1 and 5.2 (Juan *et al.*, 2014; Matzler and Hinterhuber, 1998).

$$CSC = \frac{(A+P)}{A+P+M+I} \quad \text{(Eq. 5.1)}$$

$$CDC = \frac{-(P+M)}{A+P+M+I} \quad \text{(Eq. 5.2)}$$

Where

I Number of respondents selecting ‘’Not Required’’

M Number of respondents selecting ‘’Basic Requirement’’

P Number of respondents selecting ‘’More is Better’’

A Number of respondents selecting ‘’Exciting but not a Must’’

The customer satisfaction coefficient (CSC) and customer dissatisfaction coefficient (CDC) will be calculated for each of the 48 customer satisfaction factors (CSFs) in order to develop the customer satisfaction matrix. The customer satisfaction coefficient (CSC) ranges from 0 to 1 where a value closer to 1 indicates a high influence on customer satisfaction in case a certain customer satisfaction factor (CSF) was fulfilled by the contractors. On the other hand, the customer dissatisfaction coefficient (CDC) ranges from 0 to -1 where a value closer to -1 indicates a high influence on customer dissatisfaction in case a certain customer satisfaction factor (CSF) was not fulfilled by the contractors.

2- Plot the Customer Satisfaction Matrix for Saudi Arabia Construction Industry (CSM) on a 2-D graph with four quadrants. The matrix details are as follows:

- Y-axis: The Y-axis represents the level of satisfaction (i.e. customer satisfaction coefficients) ranging from 0 to 1 as shown in Figure 5.1.

- X-axis: The X-axis represents the level of dissatisfaction (i.e. customer dissatisfaction coefficient) ranging from 0 to -1 as shown in Figure 5.1.

- Origin: The CSM origin represents the average value of the CDCs and the average value of CSCs (i.e. $\boldsymbol{CDC_{avg.}, CSC_{avg.}}$) as shown in Figure 5.1.

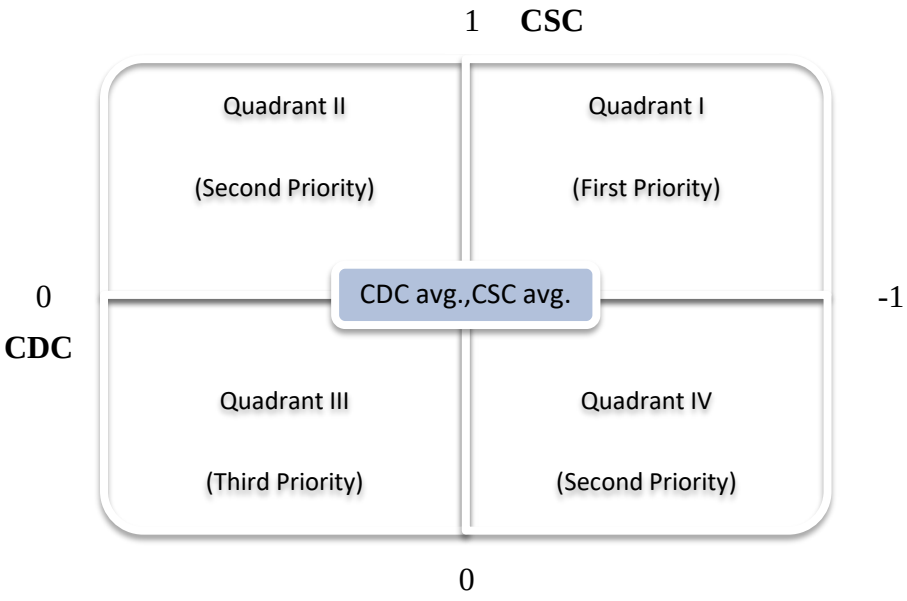


Figure 5.1: Matrix Details

The customer satisfaction factors will be prioritized according to the following criteria:

- First Priority: The CSFs that are located in quadrant I have the first priority because they have high influence on client satisfaction and client dissatisfaction (i.e. CSC closer to 1 and CDC closer to -1).

- Second Priority: The CSFs that are located in quadrant II have the second priority because they have high influence on client satisfaction and low influence on client dissatisfaction (i.e. CSC closer to 1 and CDC closer to 0). The CSFs that are located in quadrant IV also have the second priority because they have low influence on client satisfaction and high influence on client dissatisfaction (i.e. CSC closer to 0 and CDC closer to -1).

- Third Priority: The CSFs that are located in quadrant III should have the third priority because they have low influence on client satisfaction and low influence on client dissatisfaction (i.e. CSC closer to 0 and CDC closer to 0).

5.2 CSM Results

This section presents the CSM results. Firstly, the results of the customer satisfaction coefficients (CSC) and customer dissatisfaction coefficients (CDC) will be presented. Subsequently, the Customer Satisfaction Matrix (CSM) for Saudi Arabia Construction Industry will be presented to prioritize the 48 customer satisfaction factors based on their influence on customer satisfaction and customer dissatisfaction in the SA construction industry.

5.2.1 Customer Satisfaction Coefficients (CSC) and Customer Dissatisfaction Coefficients (CDC)

The CSCs and CDCs for the 48 customer satisfaction factors (CSF) are shown in Table 5.1.

Table 5.1: Customer Satisfaction/Dissatisfaction Coefficients

Customer Satisfaction Factors		Frequency (M)	Frequency (P)	Frequency (A)	Frequency (I)	CSC	CDC
A - Timeliness							
1	Plan and schedule jobs (i.e. tasks) promptly	27	22	4	0	0.490566	-0.92453
2	Adherence to schedule (time performance)	27	20	6	0	0.490566	-0.88679
3	Respond immediately to work status inquiries	25	24	4	0	0.528302	-0.92453
4	Maintain a sense of urgency	12	30	8	3	0.716981	-0.79245
5	Payment to subcontractors and suppliers (on time)	34	14	5	0	0.358491	-0.90566
6	Smoothness of handing over the project	28	23	2	0	0.471698	-0.96226
7	Avoid negligence to small jobs (i.e. tasks)	28	17	5	3	0.415094	-0.84906
					Average	0.495957	-0.89218
B - Client Orientation							
8	Display a professional approach	26	23	4	0	0.509434	-0.92453
9	Empathize with my problem, and treat it as an important request	26	16	4	7	0.377358	-0.79245
10	Completely explain policies, procedures, and coordination requirements in advance	28	20	4	1	0.45283	-0.90566

11	Provide assistance and direction for completing paperwork	29	17	4	3	0.396226	-0.86792
12	Contribution to development of design drawings when required	19	26	6	2	0.603774	-0.84906
13	Responsiveness to client issues	26	25	2	0	0.509434	-0.96226
14	Proactive to understand client/consultant	27	24	2	0	0.490566	-0.96226
15	Attention and Response to complaints	25	28	0	0	0.528302	-1
					Average	0.483491	-0.90802
C - Communications							
16	Explain the proposed job (task) prior to starting it (i.e. method statement)	27	25	1	0	0.490566	-0.98113
17	Provide notifications and explanations for work delays	30	22	0	1	0.415094	-0.98113
18	Providing periodic work progress reports	35	16	1	1	0.320755	-0.96226
19	Explain what was done to solve a particular problem	22	25	1	5	0.490566	-0.88679
20	Attitude and site manner	26	25	2	0	0.509434	-0.96226
21	Telephone inquiries and correspondence	25	22	4	2	0.490566	-0.88679
22	Open and honest communication with the client	25	26	2	0	0.528302	-0.96226
23	Communicating and interfacing with government authorities to get the necessary approvals for work on site	26	21	3	3	0.45283	-0.88679

					Average	0.462264	-0.93868
D - Cost							
24	Apply value engineering to reduce costs	23	25	5	0	0.566038	-0.90566
25	Employ adequate cost control measures	19	33	1	0	0.641509	-0.98113
26	Have adequate financing arrangements	31	20	2	0	0.415094	-0.96226
27	Agreement about changes (i.e. variations)	30	20	3	0	0.433962	-0.9434
					Average	0.514151	-0.94811
E - Quality							
28	Efforts made by the contractor to meet or exceed all specifications or conformance requirements	31	20	2	0	0.415094	-0.96226
29	Repairing of defects (speed and quality)	26	25	2	0	0.509434	-0.96226
30	Quality of hand-over documentation (e.g. Operation & Maintenance Manual)	33	18	2	0	0.377358	-0.96226
31	Quality of construction and workmanship	23	30	0	0	0.566038	-1
32	Management and implementation of agreed quality assurance and quality control procedures	33	19	1	0	0.377358	-0.98113
33	Warranty conditions offered by the contractors	28	23	1	1	0.45283	-0.96226
34	Quality of the subcontracted works	27	26	0	0	0.490566	-1

35	Degree of completion at handover inspection	31	21	1	0	0.415094	-0.98113
36	Quality of shop drawings and as-built drawings	32	19	2	0	0.396226	-0.96226
					Average	0.444444	-0.97484
F – Health, Safety & Environment (HS&E)							
37	Site organization, tidiness and cleanliness	28	23	2	0	0.471698	-0.96226
38	Concern/awareness for environmental issues	26	26	1	0	0.509434	-0.98113
39	Availability of safety training for the job site personnel	29	24	0	0	0.45283	-1
40	Accidents investigation and documentation in the site	27	26	0	0	0.490566	-1
41	Compliance with local national regulations	30	20	3	0	0.433962	-0.9434
42	Compliance with site specific safety regulations	25	27	1	0	0.528302	-0.98113
					Average	0.481132	-0.97799
G – Site Management							
43	Site supervision and control	23	27	3	0	0.566038	-0.9434
44	Adequacy of contractors resources (material, labor, and equipment)	27	25	1	0	0.490566	-0.98113
45	Competency of contractors technical team	27	26	0	0	0.490566	-1
46	Minimizing the amount of subcontracted works	16	17	10	10	0.509434	-0.62264

47	The contractor firms proactive approach and ability to deal with unanticipated problems during the execution of works	26	25	0	2	0.471698	-0.96226
48	The contractor firm working in harmony with the consultant firm	21	29	2	1	0.584906	-0.9434
					Average	0.518868	-0.90881
					Grand Average	0.485758	-0.93552

5.2.2 Customer Satisfaction Matrix (CSM) for Saudi Arabia's Construction Industry

The CSM is presented in Figure 5.2. As mentioned in section 5.2, the CSM prioritizes the 48 customer satisfaction factors based on their influence on customer satisfaction and customer dissatisfaction in the SA construction industry.

The CSFs located in the first quadrant have first priority, the CSFs located in the second and fourth quadrants have the second priority, and the CSFs located in the third quadrant have the third priority.

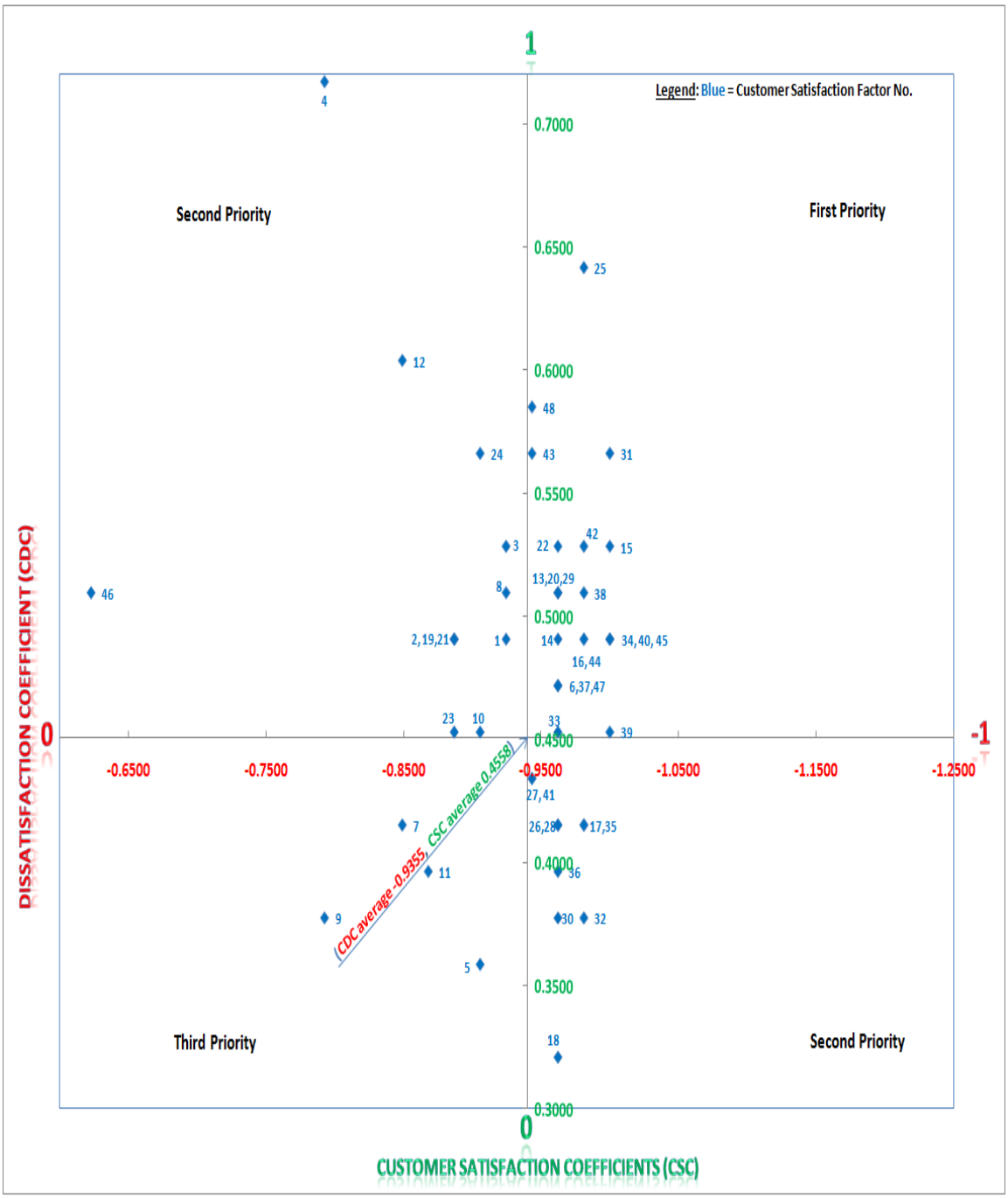


Figure 5.2: CSM

5.3 Discussions

It was observed that the average customer dissatisfaction coefficient (CDC) shown on the center of the matrix is close to -1 (i.e. -0.9355) since the majority of the clients classified the CSFs as Must-be (i.e. basic requirements) and One-dimensional (i.e. more is better). This indicates that the clients in Saudi Arabia have high expectations.

Moreover, it was found that most of the CSFs related to Group F (Health, Safety & Environment) and Group G (Site Management) fell in quadrant I which indicates that aspects related to HS&E as well as site management have high influence on client satisfaction and dissatisfaction in Saudi Arabia. Therefore, the contractors should prioritize the CSFs in these groups in order to improve customer satisfaction and achieve competitive advantage in the construction market. The CSFs pertaining to the other groups were distributed among the quadrants based on their priorities. Basically, the matrix provides a valuable tool for the contractors whereby they could focus their attention and prioritize the CSFs based on their location in the customer satisfaction matrix shown in Figure 5.2.

The CSM suggested that the CSFs in quadrant I have the first priority whereas the CSFs in quadrant III have third priority. It is worth mentioning that the results obtained from this chapter coincide with the importance scores presented in the previous chapter. Basically, the average importance score and average rank of the CSFs falling in quadrant I was 3.506 and 20.5, respectively where as the average importance score and average rank of the CSFs falling in quadrant III was 3.228 and 36, respectively. The average importance scores and average ranks coincide with the priorities set by the customer

satisfaction matrix where the CSFs in quadrant I have the highest average importance score and average rank, and thus the first priority. On the other hand, the CSFs in quadrant III have the lowest average importance score and average rank, and thus the third priority. Table 5.2 presents the comparison of the average importance scores presented in the previous chapter and the priorities suggested by the CSM.

Table 5.2: Comparison of Average Importance Scores and CSM Priorities

CSF No.	Quadrant	Average Importance Score (Chapter 4)	Priority Suggested by the CSM (Chapter 5)
6, 13, 14, 15, 16, 20, 22, 25, 29, 31, 33, 34, 37, 38, 39, 40, 42, 43, 44, 45, 47, 48	I	3.506	First Priority
1, 2, 3, 4, 8, 10, 12, 19, 21, 23, 24, 46	II	3.387	Second Priority
5, 7, 9, 11	III	3.228	Third Priority
17, 18, 26, 27, 28, 30, 32, 35, 36, 41	IV	3.498	Second Priority

CHAPTER SIX

THESIS CONCLUSION

This chapter will present the thesis conclusion including the summary of the study, research contribution, and recommendations for future research.

6.1 Summary of the Study

It is worth mentioning that there is no study conducted on customer satisfaction in Saudi Arabia's construction industry where the problem statement of this research was stated as "the lack of a mechanism for measuring and prioritizing customer (client) satisfaction in Saudi Arabia's construction industry". This research measured and analyzed the satisfaction of the public clients in Saudi Arabia's construction industry where it has filled a gap in the literature pertaining to customer satisfaction. Basically, the objectives of this research were to identify the customer satisfaction factors (CSF) for Saudi Arabia's construction industry, develop a customer satisfaction index, and a customer satisfaction matrix for Saudi Arabia's construction industry.

The first chapter of this research presented general background information about Saudi Arabia's construction industry and customer satisfaction in the construction context. In addition, the first chapter presented the statement of the problem, the research objectives and motivation, and the thesis organization.

The second chapter summarized the literature related to the concept of customer satisfaction and the main customer satisfaction factors in the construction industry. In addition, the second chapter included the identification of the main customer satisfaction factors for Saudi Arabia's construction industry where forty-eight (48) customer satisfaction factors were identified and categorized under seven (7) headings, namely Timeliness, Client Orientation, Communications, Cost, Quality, Health, Safety & Environment (HS&E), and Site Management.

The third chapter addressed the research methodology, survey questionnaire structuring, pilot study, target population, and the data gathering techniques used to develop the Customer Satisfaction Index and the Customer Satisfaction Matrix for Saudi Arabia's construction industry. The strategy adopted in this research included a combination of quantitative and qualitative techniques to address the research problem. The quantitative techniques included the usage of relative importance index (RII), gap analysis, and customer satisfaction index (CSI). Similarly, the qualitative methods included direct observations, semi structured interviews, and focus groups. This research targeted the highly experienced governmental organizations that are implementing mega projects (USD 30 million and above) in Saudi Arabia's construction industry.

The fourth chapter presented theory and calculations, results, and discussions pertaining to the Customer Satisfaction Index for Saudi Arabia's Construction Industry (CSI-SACI). The overall CSI-SACI score was 66.23 %. The CSI-SACI also included the performance gap for each CSF where the negative performance gaps revealed that, in general, the public clients are dissatisfied with the performance of construction contractors in Saudi Arabia. Moreover, in order to determine which CSFs are most causing dissatisfaction and thus require immediate corrective action and improvement, the performance gaps were ranked in ascending order where the most negative gap was ranked highest as it should receive greater attention for achieving customer satisfaction. The results (i.e. priority ranks of the performance gaps) of this research were compared with the results of the studies conducted by Soetanto *et al.*, (2001) and Al-Momani (2000). The comparison of the CSFs having the top 5 priority ranks in Saudi Arabia, United Kingdom, and Jordanian construction industry is presented in Table 6.1.

Table 6.1: Comparison of Top 5 Priority Ranks with Other Studies

Top 5 Priority Ranks			
Priority Rank	**Saudi Arabia CSFs (Al-Sagga)**	**United Kingdom CSFs (Soetanto *et al.*, 2001)**	**Jordan CSFs (Al-Momani , 2000)**
1	Adherence to schedule (time performance)	‘’Completion of defects’’	‘’Project must be carried out within budget’’
2	Adequacy of contractors resources (material, labor, and equipment)	‘’Adherence to schedule (time performance)’’	‘’The contractor will seek alternative solution with less emphasis on cost’’
3	Apply value engineering to reduce costs	‘’Payment to subcontractors and suppliers (on time)’’	‘’Project must be flexible to accommodate the primary purpose and new uses at any time’’
4	Provide notifications and explanations for work delays	Adherence to budget (cost performance)	‘’Project planning and construction is carried out correctly’’
5	Plan and schedule jobs (i.e. tasks) promptly	‘’Ability to plan and programme properly’’	‘’The project will have no deficiencies and rework during construction’’

The fifth chapter presented theory and calculations, results, and discussions pertaining to the Customer Satisfaction Matrix . The CSM was plotted on a 2-D graph with four quadrants. The Y-axis represented the level of satisfaction (i.e. customer satisfaction coefficients) ranging from 0 to 1 whereas the X-axis represented the level of dissatisfaction (i.e. customer dissatisfaction coefficient) ranging from 0 to -1. The CSM origin represented the average value of the customer dissatisfaction coefficient and customer satisfaction coefficient. Basically, the CSM prioritized the 48 customer satisfaction factors based on their influence on customer satisfaction and customer dissatisfaction in Saudi Arabia's construction industry. The CSM suggested that the CSFs located in the first quadrant have the first priority, the CSFs located in the second and fourth quadrants have the second priority, and the CSFs located in the third quadrant have the third priority.

Most of the CSFs related to Group F (Health, Safety & Environment) and Group G (Site Management) fell in quadrant I which indicates that aspects related to HS&E as well as site management have high influence on client satisfaction and dissatisfaction in Saudi Arabia. The CSFs pertaining to the other groups were distributed among the quadrants based on their priorities. It is worth mentioning that the results obtained from the CSM matched with the importance scores presented in the fourth chapter as shown in Table 6.2.

Table 6.2: Comparison of Average Importance Scores and CSM Priorities

CSF No.	Quadrant	Average Importance Score (Chapter 4)	Priority Suggested by the CSM (Chapter 5)	Match
6, 13, 14, 15, 16, 20, 22, 25, 29, 31, 33, 34, 37, 38, 39, 40, 42, 43, 44, 45, 47, 48	I	3.506	First Priority	✔
1, 2, 3, 4, 8, 10, 12, 19, 21, 23, 24, 46	II	3.387	Second Priority	✔
5, 7, 9, 11	III	3.228	Third Priority	✔
17, 18, 26, 27, 28, 30, 32, 35, 36, 41	IV	3.498	Second Priority	✔

6.2 Research Contribution

Leveraging customer satisfaction will help both owners and contractors in achieving project success. This research measured and analyzed the satisfaction of the public clients in Saudi Arabia's construction industry where it has filled a gap in the literature pertaining to customer satisfaction. Basically, this research developed a customer satisfaction index (CSI-SACI) and a customer satisfaction matrix (CSM) for Saudi Arabia's construction industry. The research contribution of the two main research outputs is as follows:

- The CSI-SACI provides an overall measure of customer satisfaction which can be monitored over time to assess the overall performance of construction contractors in Saudi Arabia. Therefore, the CSI-SACI serves as a base (reference) for comparison with future indices to monitor the contractors' performance periodically. Moreover, the CSI-SACI results probe the performance gap for each CSF in order to shed light on the improvement needed by the contractors.

  The CSI-SACI assessment will provide the regulatory agencies with valuable information regarding the satisfaction/dissatisfaction of the public clients on the national level. It would be worth measuring the CSI-SACI score on regular basis to monitor and manage the performance of construction contractors on the national level. The regulatory agencies in Saudi Arabia will subsequently be able to formulate appropriate strategies to address the clients' and contractors' deficiencies that are causing dissatisfaction to the public clients. Indeed, the CSI-

SACI will also be of interest to the existing and new construction contractors in Saudi Arabia where the CSI-SACI results highlight the areas that require corrective action.

It therefore goes without saying that developing a measurement system such as the CSI-SACI will help both the owners and the contractors in achieving project success.

- The CSM prioritizes the identified customer satisfaction factors based on their influence on customer satisfaction/dissatisfaction in Saudi Arabia's construction industry. It is anticipated that the CSM-SACI assessment will add value to the knowledge and will also be used as a practical tool to give the contractors valuable information about their clients' expectations in order to improve in the most efficient manner.

6.3 Recommendations for Future Research

Saudi Arabia is now implementing an exciting transformation program that will strengthen the economy and promote its growth. The national transformation program included a number of indicators to measure and monitor performance where the Saudi council of ministers established a number of bodies such as the National Center for Performance Measurement and the Project Management Office of the Council of Economic and Development Affairs in an aim to position Saudi Arabia in a leading position in all fields.

It is important to note, however, that customer satisfaction has not yet been identified as a central measure for the success of construction projects where there is currently no established mechanism for measuring and prioritizing customer satisfaction in Saudi Arabia's construction industry. The findings of this research are geared towards the implementation of a measurement system for customer satisfaction on the national level and the development of further research in the field of customer satisfaction in Saudi Arabia's construction industry.

The following areas are recommended for future research:

- Further research could be conducted on developing strategies for improving customer satisfaction in Saudi Arabia's construction industry.

- Further research could be conducted on customer satisfaction with the consultants' performance in Saudi Arabia's construction industry.

- Future research could be conducted on investigating the applicability of partnering relationships in Saudi Arabia's construction industry and assessing its impact on customer satisfaction.

- Further research could be conducted on investigating the relationship between customer satisfaction and its financial impact on the contractors (i.e. net income, return on assets, revenues, etc.).

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Appendix

SURVEY QUESTIONNAIRE

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King Fahd University of Petroleum & Minerals

رؤية VISION 2030
المملكة العربية السعودية
KINGDOM OF SAUDI ARABIA

DEPARTMENT OF CONSTRUCTION ENGINEERING & MANAGEMENT
KING FAHAD UNIVERSITY OF PETROLEUM & MINERALS
Client Satisfaction QUESTIONNAIRE

This questionnaire consists of two parts. The first part is regarding the respondent's general information, while the second part is for evaluating the client satisfaction in the Saudi Arabian construction industry.

PART 1 (General Information)

1. **Respondent Information:**

Name (Optional)	
Name of the Ministry/Organization	
Position (Title)	
Telephone no.	
E-mail Address	

2. **How many years of experience do you have in the construction industry?**

0	Less than 5 years	0	5 - 1 0 years
0	10-15 years	0	Over 15 years

3. **Do you have an approach to evaluate client satisfaction?**

O Yes	O No	O Unsure

*** If you have an approach to evaluate client satisfaction, please specify it in Part-2 (General Comments) of this questionnaire.**

4. **Please specify the types of projects implemented in your Ministry/Organization**

Housing & Public Buildings	Oil & Gas	Roads & Railways	Power & Telecommunications	Water & Wastewater	Ores and Minerals	Other (Please Specify)

5. **Do you think that developing an approach to evaluate client satisfaction can contribute to the success of construction projects?**

O Yes	O No	O Unsure

PART - 2 - Evaluation of the Factors Influencing Client Satisfaction

The Contractor is defined as the individual, firm, or corporation that constructs a project under the guidance of a client/consultant/designer.

Kindly take few minutes to fill out this survey. Your opinion counts!
An example is shown below for illustration.

Example	Factors	Importance				Satisfaction				Classification			
	Continuous improvement of the work processes	1	2	(3)	4	1	(2)	3	4	I	M	(P)	A

NO.	Factors	Importance Circle 1,2,3, or 4 to indicate the importance of each factor in your opinion.				Satisfaction Circle 1,2,3, or 4 to indicate your level of satisfaction with the actual performance of your contractors.				Classification Circle I, M, P, or A to indicate your expectations about each factor.			
		Extremely Not Important (1)	Not Important (2)	Important (3)	Extremely Important (4)	Extremely Dissatisfied (1)	Dissatisfied (2)	Satisfied (3)	Extremely Satisfied (4)	Not Required (I)	Basic Requirement (M)	More is Better (P)	Exciting but not a Must (A)
A - Timeliness													
1	Plan and schedule jobs (i.e. tasks) promptly	1	2	3	4	1	2	3	4	I	M	P	A
2	Adherence to schedule (time performance)	1	2	3	4	1	2	3	4	I	M	P	A
3	Respond immediately to work status inquiries	1	2	3	4	1	2	3	4	I	M	P	A
4	Maintain a sense of urgency	1	2	3	4	1	2	3	4	I	M	P	A
5	Payment to subcontractors and suppliers (on time)	1	2	3	4	1	2	3	4	I	M	P	A
6	Smoothness of handing over the project	1	2	3	4	1	2	3	4	I	M	P	A
7	Avoid negligence to small jobs (i.e. tasks)	1	2	3	4	1	2	3	4	I	M	P	A
B - Client Orientation													
8	Display a professional approach	1	2	3	4	1	2	3	4	I	M	P	A
9	Empathize with my problem, and treat it as an important request	1	2	3	4	1	2	3	4	I	M	P	A
10	Completely explain policies, procedures, and coordination requirements in advance	1	2	3	4	1	2	3	4	I	M	P	A
11	Provide assistance and direction for completing paperwork	1	2	3	4	1	2	3	4	I	M	P	A
12	Contribution to development of design drawings when required	1	2	3	4	1	2	3	4	I	M	P	A
13	Responsiveness to client issues	1	2	3	4	1	2	3	4	I	M	P	A
14	Proactive to understand client/consultant	1	2	3	4	1	2	3	4	I	M	P	A
15	Attention and Response to complaints	1	2	3	4	1	2	3	4	I	M	P	A

NO.	Factors	Importance Circle 1,2,3, or 4 to indicate the importance of each factor in your opinion.				Satisfaction Circle 1,2,3, or 4 to indicate your level of satisfaction with the actual performance of your contractors.				Classification Circle I, M, P, or A to indicate your expectations about each factor.			
		Extremely Not Important (1)	Not Important (2)	Important (3)	Extremely Important (4)	Extremely Dissatisfied (1)	Dissatisfied (2)	Satisfied (3)	Extremely Satisfied (4)	Not Required (I)	Basic Requirement (M)	More is Better (P)	Exciting but not a Must (A)
C - Communications													
16	Explain the proposed job (task) prior to starting it (i.e. method statement)	1	2	3	4	1	2	3	4	I	M	P	A
17	Provide notifications and explanations for work delays	1	2	3	4	1	2	3	4	I	M	P	A
18	Providing periodic work progress reports	1	2	3	4	1	2	3	4	I	M	P	A
19	Explain what was done to solve a particular problem	1	2	3	4	1	2	3	4	I	M	P	A
20	Attitude and site manner	1	2	3	4	1	2	3	4	I	M	P	A
21	Telephone inquiries and correspondence	1	2	3	4	1	2	3	4	I	M	P	A
22	Open and honest communication with the client	1	2	3	4	1	2	3	4	I	M	P	A
23	Communicating and interfacing with government authorities to get the necessary approvals for work on site	1	2	3	4	1	2	3	4	I	M	P	A
D - Cost													
24	Apply value engineering to reduce costs	1	2	3	4	1	2	3	4	I	M	P	A
25	Employ adequate cost control measures	1	2	3	4	1	2	3	4	I	M	P	A
26	Have adequate financing arrangements	1	2	3	4	1	2	3	4	I	M	P	A
27	Agreement about changes (i.e. variations)	1	2	3	4	1	2	3	4	I	M	P	A
E - Quality													
28	Efforts made by the contractor to meet or exceed all specifications or conformance requirements	1	2	3	4	1	2	3	4	I	M	P	A
29	Repairing of defects (speed and quality)	1	2	3	4	1	2	3	4	I	M	P	A
30	Quality of hand-over documentation (e.g. Operation & Maintenance Manual)	1	2	3	4	1	2	3	4	I	M	P	A
31	Quality of construction and workmanship	1	2	3	4	1	2	3	4	I	M	P	A
32	Management and implementation of agreed quality assurance and quality control procedures	1	2	3	4	1	2	3	4	I	M	P	A
33	Warranty conditions offered by the contractors	1	2	3	4	1	2	3	4	I	M	P	A
34	Quality of the subcontracted works	1	2	3	4	1	2	3	4	I	M	P	A
35	Degree of completion at handover inspection	1	2	3	4	1	2	3	4	I	M	P	A
36	Quality of shop drawings and as-built drawings	1	2	3	4	1	2	3	4	I	M	P	A
F – Health, Safety & Environment (HS&E)													
37	Site organization, tidiness and cleanliness	1	2	3	4	1	2	3	4	I	M	P	A
38	Concern/awareness for environmental issues	1	2	3	4	1	2	3	4	I	M	P	A

NO.	Factors	Importance Circle 1,2,3, or 4 to indicate the importance of each factor in your opinion.				Satisfaction Circle 1,2,3, or 4 to indicate your level of satisfaction with the actual performance of your contractors.				Classification Circle I, M, P, or A to indicate your expectations about each factor.			
		Extremely Not Important (1)	Not Important (2)	Important (3)	Extremely Important (4)	Extremely Dissatisfied (1)	Dissatisfied (2)	Satisfied (3)	Extremely Satisfied (4)	Not Required (I)	Basic Requirement (M)	More is Better (P)	Exciting but not a Must (A)
39	Availability of safety training for the job site personnel	1	2	3	4	1	2	3	4	I	M	P	A
40	Accidents investigation and documentation in the site	1	2	3	4	1	2	3	4	I	M	P	A
41	Compliance with local national regulations	1	2	3	4	1	2	3	4	I	M	P	A
42	Compliance with site specific safety regulations	1	2	3	4	1	2	3	4	I	M	P	A
G – Site Management													
43	Site supervision and control	1	2	3	4	1	2	3	4	I	M	P	A
44	Adequacy of contractors resources (material, labor, and equipment)	1	2	3	4	1	2	3	4	I	M	P	A
45	Competency of contractors technical team	1	2	3	4	1	2	3	4	I	M	P	A
46	Minimizing the amount of subcontracted works	1	2	3	4	1	2	3	4	I	M	P	A
47	The contractor firms proactive approach and ability to deal with unanticipated problems during the execution of works	1	2	3	4	1	2	3	4	I	M	P	A
48	The contractor firm working in harmony with the consultant firm	1	2	3	4	1	2	3	4	I	M	P	A

- **General Comments**
  This section gives you the opportunity to provide your comments on the questionnaire and the issues that it raises.

- **What do you think is required from the contractors to achieve client satisfaction and build long-term business relationships with the clients in the Saudi construction industry?**

Thank you for completing this questionnaire. The time and effort that you have spent is highly appreciated. For any queries or clarifications about any ambiguity or error in this questionnaire, please contact the below advisor or researcher.

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VITA

Khalid Jamal Al-Sagga was born in Riyadh, Saudi Arabia on October 14, 1988. He has earned his American Diploma with a first honor degree from Future Window International School in June 2006. Khalid has also earned his Bachelor of Science in Applied Civil Engineering with a second honor degree from King Fahd University of Petroleum and Minerals in June 2011. He has completed his internship at King Saud University strategic construction program and Saudi Binladen Group. After graduation from KFUPM, Khalid has joined the Saudi Railway Company on August 1, 2011. Basically, Khalid has paved a way to shape his career where he has been engaged in both buildings and civil engineering contracts with values over several billion dollars including King Abdullah Financial District, Student Housing Project at King Saud University, SAR's North-South Railway Project, and SAR's Saudi Landbridge. His international experience includes workshops and training programs in the United Kingdom, Germany, Spain, Taiwan, and UAE. To broaden his horizons and advance in his professional career, Khalid was very much interested to continue his studies for a Master Degree. In March 2017, Khalid Al-Sagga's mission was completed where he has earned his Master of Science degree in Construction Engineering and Management from King Fahd University of Petroleum and Minerals, Dhahran, Saudi Arabia.